THE IRON TRADE REVIEW

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THE IRON TRADE REVIEW.

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THE WEEK IN IRON CIRCLES.

General Features. The improvement in general trade has not yet been appreciably felt in crude iron. Nearly all makers are firmly convinced that there will be an improvement later, and are indisposed to take forward contracts at present low prices. It should be noted that some of the very low figures that have been mentioned are for spot delivery and cash, and that the same furnaces making these figures are holding stiff for forward deliveries. There is nothing in the general situation that is not hopeful and full of promise. If it were not for the present large rate of production, it is quite certain that iron would begin to move upward very promptly. As it is, much will depend upon the further course of the railroads in purchasing supplies and equipment. In finished iron there is a much more active demand. Everything connected with agricultural work, car work, architectural work, etc., is picking up noticeably. The mills are afraid yet to advance prices, but if the present demand keeps up they will shortly mark up figures. This will give pig iron a chance. In Southern markets there is more inquiry for iron. It is felt that bottom has been reached and that steady trade can be depended upon for the balance of the year; consumers, however, are not speculating, but are purchasing only as orders are received. The buying on the part of railroad companies however has commenced, and orders are given by them in amounts nearly double that of preceding months; the result has been that rolling mills have advanced the prices of iron, though there has been no movement in raw material. Car wheel irons at Louisville are very dull and prices are being made as low as at any period. Lake Superior irons are also offered in this market on basis of $18.50 Louisville, which is probably the lowest price ever made for Lake Superior in this territory. The Chicago pig iron market is in a healthy condition; while no large amount of activity is in sight, yet the volume of orders placed is increasing, some of these running well up in size. Small orders are still numerous, but the week has shown placing of a number of 500 tons and upwards. Prices remain practically unchanged on metal of all classes; there is, however, less disposition on the part of furnaces and sellers to contract for long scattered deliveries at lowest market figures, and also less inclination to sacrifice values under fear other sellers will in the meantime get all the business going. Market may be said to be firm as to prices, with the demand good for all kinds of coke metal. In charcoal lines one contract of over 1,000 tons Southern iron has just been consummated and other inquiries are in sight. The outlook for consumption during balance of the year is good. Railroad buying has not begun as heavily as expected, but some good sized contracts for material and supplies have been placed. Railroad lines are on the verge of one of the busiest seasons they have ever had, and this is sure to revive general business as soon as proceeds from the crops moved get into circulation. The steady increase in the inquiries received for the past few weeks at Detroit, gives promise of better business in the near future. This, together with the fact that three or four sales of considerable magnitude have been reported, and others now pending, is evidence that the inquiries were from purchasers who were covering for contracts taken. While the demand is greater for Lake Superior charcoal than any other class, yet there are some sales of Southern and Ohio irons reported. Consumers are asking that shipments on old orders be hurried forward, as they find they are running short. The firmness of the market is shown very conclusively by the buyer paying the recent advance in rates from the South and on lake rates. The Fall trade at Buffalo has hardly opened out, and the fact that prices have been so well sustained under quiet conditions, gives great encouragement to producers who are working on such narrow margins. Lake Superior charcoal iron has shown increased firmness. Other qualities remain unchanged. At St. Louis what few sales have been made were at very low figures. The outlook is more encouraging for better prices.

The Local Situation. If all the happenings of the past Summer, all the speculations incident thereto and arising out of it, and a thousand rumors that have found their way into print, were all grouped together and published as a whole, the result would reflect the condition of the market as correctly as ever it did, owing to the absence of any sort of activity anywhere, in any line, and for any purpose whatsoever, outside of the regular business that was contracted for a long time ago. The entire range of iron and iron ore interests appear to be dormant, awaiting, some people hold, the disposition of the crops, or the movement of the crops, or the sale of the crops, anything, if it only has to do with the crops. The crops are the latest fad to use in connection with the iron business, and it is more innocent by far than would be a movement to deal in pig iron warrants, as was talked of some months ago, and as is again talked of in certain quarters in lieu of the regular business, which would disperse all such ideas. Charters have advanced during the week to a dollar from Escanaba, with fifteen cents added for both Marquette and Ashland freights. Of course, it is the inevitable crop argument that has advanced the rate, and which will be used again with good effect during the remainder of the month. It ought to be considered, however, that during August, when the vessel owners played hookey with the ore interests, quite a few of the ore producers, anticipating the situation, covered the bulk of the ore they have contracted to bring down this season, so that the fluctuations in the rates of vessel freights from hence on and until the close of navigation will fail to have the influence they carried a month ago. So it comes that this series of charters imparts steadiness to the vessel market as well. There is no difference of opinion that the ore to be sold for next season's consumption will be materially higher than that last sold, or else there will be a most surprising shrinkage of the ore production on all the ranges. The iron ore men have not yet made the personal experience of poor times that has come home to the dealers and manufacturers, but it is a matter of a very short time when they will be brought to a realizing sense of the peculiar condition from which the market is suffering, and then some concerted action may be looked for. That there has been no money in ore this year is too well known to cause comment; but it is true as well that in not a few instances there will be a considerable loss, owing to the sudden advance, some weeks ago, of lake freights, and the ore men will hardly care to repeat the experiment. Everything considered, it may be set down that the prices of '92 ore will be practically those of '90. The pig iron business is as dull and lifeless as ever, and nothing has occurred to mar the serene inactivity that has prevailed for months. Beyond filling old orders, the furnaces report no business, and the price is so low as to offer no inducement to go in for any new orders at the ruling quotations. Nevertheless, some of the more hopeful people in the business predict a good Fall trade, although it must be confessed that there is no apparent reason for any such expectation. The pig stocks are quite small, hardly exceeding a two weeks' output of the furnaces in the Central West, but the consumption is splintered up into so many insignificant orders, as almost entirely to lose their effect upon the trade. Manufactured iron is also quiet, and the price is low.

DEATH OF A PROMINENT OHIO IRON MANUFACTURER.

The name of John Campbell has for fifty years been identified with the development of the famous Hanging Rock iron region of Ohio, and his services to the State and to the iron industry, as well as to the city of Ironton, which he founded, are distinguished and invaluable. His connection with the iron business began in 1832, when he became clerk at Pine Grove furnace. The next year he became associated with Mr. Hamilton in the building of the Hanging Rock forge, long since dismantled. The same year, with Andrew Ellison, he built Lawrence furnace for J. Riggs & Co. In 1834, in connection with Robert Hamilton, he built Mt. Vernon furnace, and moved there to manage it. Here he remained for some years, though his interests in the iron business kept spreading all the time. It was through his suggestion that the first hot blast was erected in America —this was at Vesuvius furnace. He was also the first to put the boilers and hot blast over the furnace stack. This was in 1841. In 1844, with John Peters, he built Greenup furnace in Kentucky; in 1846 he built Olive furnace, and in 1847, Gallia. In 1849, he, with others, built Keystone. In 1852, he built Howard and Washington. In 1854, he built Madison. The last furnace he built was Monroe, in 1856. He purchased and owned an interest in other furnace properties, notably the Hecla furnace.

Of his business achievements from this time on the Ironton *Register* gives this interesting account:

About 1845, Mr. Campbell moved from Mt. Vernon furnace to Hanging Rock, where he lived until 1851, when he moved to Ironton. But in the meantime he had a great scheme on hand—the founding of a new town. For this purpose, he organized the famous Ohio Iron & Coal Co., composed of about twenty furnacemen and prominent men of the region, and purchased the land where the central part of Ironton now is. Here a town was laid out in 1849, and many lots sold. People flocked to the new town, attracted by its moral, as well as its industrial promises. Mr. Campbell was the moving spirit. His genius shone in every direction. He provided for churches, for school houses, for manufactures—for every healthful influence and industrial advantage. He was then in the prime of life, and he infused his energy into everybody. Every good work he encouraged with money and personal influence. His good nature and his clear insight of things made him the ideal founder of a new town. He despised shams and delusions, and builded only on honest worth and merit.

In those early days, to give the town a start, he took stock in every good enterprise—in the old Iron bank, in the mills and foundries, the nail and plow factories. There was scarcely anything worthy but what received his substantial encouragement. He was interested in fourteen furnaces during his life and a score of other enterprises. He was an original stockholder in the Ironton rolling mill and Olive foundry and machine shops, both of which were started in 1852. It was through his influence that the first telegraphic wire was extended here. He was the President of the great Union Iron Co., and proprietor of Hecla; and for years President of the Iron Railroad Co.

In those days he was a most indefatigable worker for railroad communication with Ironton, taking an interest in every project. He was a leading promoter of the Scioto Valley, which first connected this town to the world by rail. He was accounted by railroad men and financiers as a man of truthful forecast. The great enterprises that now reach this city, he foresaw and predicted at a time when all others were incredulous. No man saw manifest destiny clearer than John Campbell did. * * *

Mr. Campbell had been a very rich man in his life time. In 1872, an inventory of his property figured up over a million dollars. But he kept on and reverses overtook him. Several unfortunate investments made inroads on his wealth, until 1883, when the Union Iron Co. failed, and this compelled him to make an assignment. Old age and fierce competition in the iron business prevented his recovery from financial disaster, but he went down a brave and honest man. His financial distress never affected the sincere esteem in which he was held, or abated a jot the great influence he had in the community.

Such is the story of a long and useful life. The end came peacefully last Sunday morning, in his 84th year. Though he left no collossal fortune, he left what is inestimably better, the sincere respect of the community in which he dwelt.

A GREAT IRON CONSOLIDATION.

Lively interest has been manifested in iron circles, the past week, over the reorganization of the National Tube Works Company, of McKeesport, Pa., and its consolidation with three other large concerns, the Republic Iron Works, of Pittsburgh, the Monongahela Furnace Company, of Pennsylvania, and the Boston Iron and Steel Works, of Boston, Mass. From various sources we learn that the National Tube Works Company remains the controlling factor in the new combine. This company has been in business over twenty-five years, and it has a capital of $3,000,000. It is understood that its stock goes into the new organization on the basis of $280 a share, giving it, with additional holdings, about $9,000,000 out of $11,500,000 of the shares of the new company. The company will manufacture iron tubing, wrought iron pipes, muck bars, blooms, plates and terne plates. The organization will control over one-half of the production in the country of these articles. One-half of the stock issued is preferred stock, while the rest is common stock. The old National Company now employs 10,000 men, and the other companies employ about 5,000 men.

The officers of the company are Edward W. Converse, President; David W. Hitchcock, Vice-President; William S. Eaton, Treasurer; P. W. French, Secretary; Edmund C. Converse, General Manager. The directors are Edward W. Converse, David W. Hitchcock, William S. Eaton, P. W. French, Edmund C. Converse, W. J. Curtis, of Sullivan & Cromwell, New York.

It is estimated that a few other important concerns will come into the new organization. Among those mentioned in connection with the enterprise are: Morris, Tasker & Co., of Philadelphia; Spang, Chalfant & Co., of Pittsburgh and the American Tube Works. The new company was incorporated under the laws of New Jersey, with a nominal capital of $10,000, privilege being given to increase it, which has now been done.

AMERICAN VS. ENGLISH STEEL SHIPBUILDERS.

An interesting question has been raised among shipbuilders on the Atlantic coast as to the comparative cost of constructing American and British steamships, caused by the remark of a New York ship broker that the Keweenaw and Mackinaw, built in the United States, cost $275,000 each to build, and that the Mineola and Montauk, English built, but of the same carrying capacity and speed, cost but $125,000 each to build, or, that Americans were obliged to pay 120 per cent. more at home for ships than they would cost if purchased abroad. The respective dimensions of the two representative steamships named are as follows:

	Keweenaw. (American.)	Montauk. (British.)
Length over all (feet)	297	284
Beams (feet)	42	37.9
Depth of hold feet)	28	27 9
Gross tonnage	6,512	2,430.28
Net tonnage	2,004	1,889.57
Horse-power (triple expansion engine)	1,300	
Diameter of cylinder	21 in.—35 in.—56 in.	23 in.—38 in.—62 in.
Stroke	3½ ft.	3½ ft.

Our alert contemporary, *Seaboard*, took issue with the statement in question and accordingly wrote to a number of leading Eastern shipbuilders for information. The replies are quite interesting and seriously reflect upon the intelligence of the ship broker who made the assertion quoted.

One company states that it would undertake to build a steamship like the Keweenaw for $265,000, and it positively asserts that the British builders cannot construct a craft like the Montauk for less than $210,000, a difference in their favor of 26 per cent, instead of 120 per cent., as claimed. In proof of its position the corporation in question states that they offered some time ago to build a ship 225 feet in length for $160,000, the British price being $125,000, or 28 per cent. lower than the American figure. Still other firms put the difference as low as 10 or 15 per cent. The following from "a concern, famous on the Chesapeake for a long number of years," is to some extent an eye-opener:

We would not be allowed to build ships in this country of such poor quality, both as to material and workmanship, as is built upon the Clyde, for the reason the English Lloyds will not permit it to be done, and give us same rating as to class of ship. These people have their chief inspector located in this country, along the several subordinates from England, and those who are Americans are obliged to obey the mandates of these would-be destroyers of American shipbuilders, consequently we are prevented from competing with them (in price) for the same class of ship. The shipbuilders of the Clyde will hesitate a long time before they will build a ship from specifications drawn up by Americans and to be used by Americans. In reference to the ship "Mackinaw," will say: The cost of this ship of the dimensions given by you, and built in England, but plans and specifications American, superintended by an American interested in getting what belongs to him under the specifications, will not be more than 15 per cent. less than we could build her for in this country. Should the same ship, however, be built under the existing rules in England, and we to duplicate her (as to dimensions) in this country, the difference would be about 35 per cent. in favor of England, but we have at least a 35 per cent. better ship.

Five years ago John Roach, the most famous of modern American shipbuilders, wrote *The Iron Trade Review* as follows:

The difference between the first cost of a ship on the Delaware and on the Clyde never would prevent us from competing with other countries. A ship on the water is very much like a factory on the land. You may give a man a factory, but if you compel him to pay 40 per cent. more for his labor than another who pays a good price for his factory, how long do you suppose it would be before the man who gets his factory free will be compelled to close it? One man pays, perhaps, 5 or 6 per cent. on the capital invested in his buildings, while the other pays 40 per cent. more for his labor. Or suppose one man builds his factory at a cost of say 20 per cent. more than his neighbor, but both pay the same price for labor in running, and the interest on capital the same; the man whose factory cost him more would certainly not close it because the first cost was greater. So, I conclude that the difference in the first cost of our ships is not the reason why we do not build for the for-

eign trade. Your own judgment will doubtless draw similar conclusions. The increased cost of running ships (more than double that of foreign countries) and the lack of encouragement from our Government are the main causes for our not owning and running ships in the foreign trade. While England, as a maritime nation, has a policy which holds out inducements to capitalists, we have none.

That puts the case in a nutshell and answers a great many questions that naturally arise from a consideration of the foregoing facts.

OUR ESTEEMED CONTEMPORARIES.

Among the attentive students of the columns of *The Iron Trade Review* none are more keenly critical than our esteemed contemporaries. Here is a little batch of opinions on our opinions from the current mails: That vigorous advocate of Protection across the border, the *Canadian Manufacturer*, of Toronto, shows in the following paragraph that even an ably edited journal may occasionally go astray. It says:

Our usually level-headed contemporary, the Cleveland *Iron Trade Review*, is indignant because a concern in St. Louis, Mo., who desires to engage largely in the manufacture of tinplate, wish to import skilled and experienced workmen from the tinplate works in Wales for the purpose. The tinplate industry not being an established fact in the United States, the Government had decided that the immigration laws, which prevent the importation of labor under contract, did not apply in this case, and thereat our contemporary is quite indignant, declaring that the Government "have placed a first-class weapon in the hands of the opponents of American tinplate, and the sooner they retire from their position the better. The spirit of American protection is to build up new industries through the employment of American labor; anything that calls itself protection and ignores this very plain and common-sense proposition can be safely set down as the spurious article." This is not our funeral, but we feel considerable interest in the result of the efforts now being made to establish the tinplate industry in the United States. We suggest that if the Welsh workmen emigrate to the United States, with the intention of making that country their home, from the day they set foot on those shores they are American workmen to all intents and purposes. A very large portion of the inhabitants of the United States are of foreign birth, but this fact does not imply that they are not really and truly Americans if they have complied with the naturalization laws. On the same principle advanced by *The Iron Trade Review* objection might be made to the introduction of foreign capital going there for investment in manufacturing enterprises. Both foreign capital and foreign labor, in our opinion, become instantly Americanized when employed in a manufacturing industry in that country.

Our Canadian *confere* is evidently not posted regarding the objects, provisions and limitations of the alien contract law. It is not, as our contemporary would appear to understand, directed against voluntary, but forced immigration, not against free, but contract labor. This being the spirit of the law, of course, the *Manufacturer's* parallel regarding foreign capital has no force whatever. Would our contemporary favor the forced importation of low-priced foreign labor to displace honest and deserving Canadian labor?

Says the *National Labor Tribune* (Pittsburgh):

"The Cleveland, O., *Iron Trade Review*, which is well located to keep a lookout over the northern border, and seems thus to do, calls attention to the following important facts:

1. A year ago Canada bought her pig iron exclusively from Great Britain. Now she is importing very largely from the United States. Indeed, the large proportion of pig iron sold nowadays in Canada is American.

2. The cheapest pig iron in the Canadian market to-day comes from Alabama.

3. The market for American bar iron is also widening daily, resulting, of course, in the displacement of just so much of the English article.

Is there any connection between the above facts and the following paragraph in the current issue of the *Canadian Manufacturer:* "The "duty upon pig iron should be a protective duty, by which the pig "iron industry would become established. A duty of only $4 per ton "is a duty for revenue only, the entire removal of which would not "injure the country any more than the removal of the duty upon raw "sugar. The duty upon pig iron should not be less than $7 per ton."

The Iron Trade Review in its last issue presented figures showing that Cleveland received but 20 per cent. of the total receipts of ore at Lake Erie ports during the first half of the present season, as against 29 per cent. during the full season of 1890, while all other ports show a gain in receipts. The aim is to call attention to Cleveland's steady loss in receipts as compared with other ports. While it is true that a lack of facilities here has resulted in great loss to the city, the comparison this season is of light value, as labor troubles early in the season caused idleness on the Cleveland docks up to June while delay from the same cause at Ashtabula and other places was comparatively of little significance.—[Cleveland Marine Review.

The Marine Review, in making the statement that the labor troubles at Ashtabula were of "comparatively little significance," either willfully misrepresents, or shows a lamentable lack of knowledge of subjects on which it is supposed to be well informed. The strike at Ashtabula lasted fully as long as at Cleveland. In facilities for handling ore, Ashtabula is away ahead of Cleveland, and the sooner the Cleveland papers acknowledge this fact and cease their senseless croaking, the better.—[Ashtabula Telegraph.

It scarcely seems to us the part of wisdom to cover up or minify the very plain facts taught by the statistics which we have from year to year presented to the public, showing the steady piling up of ore receipts at other ports, invariably at the expense of Cleveland.

Those British manufacturere who intend being represented at the forthcoming World's Fair, at Chicago, are advised by Mr. John Wilson, ex-M. P., to send the best goods they have in stock, and to mark them at cost price. By this means Mr. Wilson thinks "people would see what Great Britain could do in providing good, elegant and cheap materials; and they would also see how it was that they had to pay so much more for them over in America than in this country."—[Glasgow Engineer.

To heighten the effect and emphasize the contrast, how would it do for British exhibitors to frame and hang up in a conspicuous place comparative scales of wages as between British and American workingmen, also a few photographs showing the beauties of woman and child labor in English iron mines?—[Iron Trade Review.

It is the height of folly to endeavor to create the impression that the higher wages paid in the United States is the result of legislative enactments, or the woman and child labor in England is a consequence of fiscal system of that country. We doubt very much indeed, whether any women or children can be found in English mines at the present day, although without doubt there is too much under-paid labor in that country as well as in this. The photographs might as well be taken for that matter in Chicago as in Glasgow. If they would not show the women and children working in mines they could at least present an object lesson in the way of proving that the under-paid slaves in the "sweat-shops" enjoy no blessings for which they need thank McKinley legislation.—[American Artisan.

We rather expected this from the *Anglomaniac Artisan*. Its alacrity in springing to the defense of everything English is only equaled by the avidity with which it pounces upon everything purely American for its jibes and sneers. To pile up facts in proof of the proposition that a protective tariff benefits the wage-earners would be like casting pearls before swine, in this case; but let the *Artisan* ask any leading labor paper, as, for instance, the *National Labor Tribune*, whether the assertion is not true. We will abide by the decision.

MR. L. W. ROBINSON has been appointed Chief of the Department of Machinery of the Columbian Exposition. Mr. Robinson is a chief engineer in the United States Navy; is at present President of the Examining Board of United States Naval Engineers at Philadelphia, and during the Centennial was first officer under General Albert, the Superintendent of Machinery.

Is the ice to be broken in the steel rail market at last? An order for 10,000 tons was placed last week with an Eastern mill, and other large orders are in the air. Prices, however, continue very low—$30.75@$31 at tidewater.

THE OUTLOOK AMONG THE AGRICULTURAL IMPLEMENT WORKS.

The manufacturers of agricultural implements are preparing for a large output next year, and orders for iron have just been placed in quantities never before reached by them. This is not only an encouraging feature for the implement trade, but it is important to the iron trade as well, and so in a measure to all lines of the manufacturing buisness, for activity in iron manufacture always exerts a healthy influence over other lines.

The iron manufacturers have always regarded the implement business as a sort of "filler" for the season's work; some have always endeavored to get a portion of the business, while others have not. This year the general depression in iron created a hungry feeling among the iron firms, and none of them have considered implement orders beneath their notice.

It is now certain that the orders for iron placed by implement makers have exceeded in amount any previous season's orders by a good margin. It is asserted that every firm has increased its iron orders over last year, and this refers equally to bar iron and pig iron. The contract prices have been in the implement makers' favor, for the scramble on the part of the iron manufacturers after the business has resulted in very low prices. While this is favorable to the implement firms, it is of benefit to the iron men, also, as it allows them to keep their plants in operation even though the profit is not great. The implement orders are so liberal that it is thought the running orders for iron will make the season profitable to the iron men as well.

There will be a good deal of iron and steel needed for railroad business next year, and if the implement men can throw enough business to the foundries to help out a season of prosperity, surely the iron men will not begrudge them the prosperous season that seems to pe promised.

The situation in the Northwest is very encouraging. The immense crop that has just been harvested will supply hundreds of farmers with money which will be spent in replenishing their farm equipment. The condition of the farmer of Minnesota and the Dakotas is improving. He is getting out of debt, and when that is accomplished this will be the best implement field in the country. The Northwestern field is fully occupied, however, and this is pretty well understood by outside manufacturers.—[Farm Implements, Minneapolis.

SHELBY, OHIO.

Among the advancing young industrial centers of Ohio is Shelby, most favorably situated at the junction of the Baltimore & Ohio and the Cleveland, Cincinnati, Chicago & St. Louis railroads, 67 miles southwest of Cleveland. Its 2,500 inhabitants are for the most part intelligent, prosperous and progressive, and its public spirit is shown by the fact that, within the past six months, its enterprising citizens have located within its borders no less than four large manufacturing establishments, with an aggregate paid in capital of $275,000, of which they have furnished from half to two-thirds of the cash. That full attention has been paid to the beautifying of the town is evident from the fact that it has five miles of macadamized streets, handsome churches and public buildings, and one of the best electric lighting plants in the State. There are seven miles of arc wire, 45 arc lights, and an incandescent system for stores and residences. The works are owned by the municipality, and the only public debt is covered by bonds to the amount of $15,000, issued on account of this improvement. Among the public buildings are the Town Hall, the Central High School, the Postoffice, etc. The tax valuation is $800,000 and the tax rate is less than two mills. There are eligible manufacturing sites in abundance, and very liberal arrangements are made with desirable industrial establishments. The residence streets are very handsome and attractive. Among the leading industrial and financial concerns we note the following:

THE SHELBY MILL COMPANY, with a paid-up capital of $125,000, is one of the oldest and most prosperous industries of the town, with an enviable reputation throughout the country. Its officers are: D. L. Cockley, President; M. H. Davis, Secretary and Treasurer. Mr. Davis is one of the wide-awake young business men of the place, and is ever at the forefront of public improvements. Besides the mill proper (a completely equipped modern establishment) the company owns three elevators at Shelby, one at Shiloh and one at La Rue. The company also owns its own barrel factory. The mill capacity is 800 barrels per day, and the elevator capacity is 100,000 bushels. Employment is given to 55 men.

THE SHELBY STEEL TUBE COMPANY is a recent addition to the town's industries, its specialty being welded cold-drawn steel tubes for bicycles, boilers, and everything where lightness and strength are required. It is the only factory of the kind in the United States, and employs a large number of men in its new and extensive plant. Those who have used this tubing pronounce it superior to the best English make. The company is officered as follows: D. L. Cockley, President; H. A. Lozier, (of Cleveland) Vice-president; B. J. Williams, Secretary and Treasurer.

THE BEECHER FURNACE AND FOUNDRY COMPANY was incorporated in March, 1891, with a capital stock of $25,000; President, H. M. Dick; Vice-president, W. F. Beecher; Secretary, J. Myers; Treasurer, B. J. Williams. This company has won an enviable reputation for the manufacture of high grade furnaces and general foundry work, and is one of the growing industries of Shelby.

THE SHELBY CYCLE MANUFACTURING COMPANY is another large concern lately located in Shelby. It was organized in June, 1891, has a capital stock of $200,000, and is directed by the following officers: D. L. Cockley, President; W. W. Skiles, Vice-President; F. S. Hodgeman, General Manager; J. S. Riddle, Superintendent; H. M. Dick, Treasurer; J. W. Williams, Secretary. Contracts for the $40,000 building to be occupied by this extensive concern were let last week. The building will cover 5,000 square feet of space, being located on both lines of railroad. The company will manufacture only the best grades of cycles.

THE FIRST NATIONAL BANK is the only bank in Shelby, and since its establishment in 1872, has always been under the most careful and conservative management, enjoying the full confidence of the public. Its capital and surplus amount to $73,000. The officers are: W. R. Bricker, President; J. L. Pittinger, Vice-President; B. J. Williams, Cashier; J. W. Williams, Assistant Cashier.

HOTEL SHELBY, J. H. Castner, proprietor, is centrally located, and is conceded to be the best hotel in town. It is lighted by electricity and heated by hot air. The *cuisine* is first-class, the rooms comfortable, and the service capable and obliging.

LAKE SUPERIOR MINING NOTES.

The Lake Angeline is not forcing shipments this season, and it looks as if they would carry over something like 50,000 tons. The product of this company is one that will sell readily, but they are in no hurry to send out at prices quoted. The ore is too good to be sacrificed. Lake Angeline is of much value in bringing poorer ores up to the desired standard in furnace work. Its great purity will ever make it a favorite—[Iron Ore.

Development of the new ore find at the Crystall Falls mine is progressing very favorably, under the able management of Supt. O. F. Reibel. The first pit in the new ground is distant from the main shaft in the old work about 150 feet nearly east and at a depth of 50 feet the vein was cross-cut, giving 41 feet of clean ore. The pit or shaft is better, is going for an additional 50 feet and is now down 21 feet below the cross-cut. The foot wall was encountered at a little above present depth which threw the shaft out of the vertical. At the depth of 100 feet in this shaft the vein will again be cross-cut. One hundred and twenty feet east of this is another shaft with a depth of 50 feet, from which point the vein was crossed and gave 40 feet of clean ore and about nine feet of mixed ore on the hanging wall side. Between the two shafts mentioned the surface has been stripped to the ore, the depth of surface being from three to five feet; this will be worked open cut, making a pit 50 x 100 feet and the ore will be raised by derricks, which will soon be constructed. The vein has been tested east and shows the ore to continue a distance of 100 feet. No attempt will be made to ship any ore this season, but all energy will be put to the preparing the property for a fine output next year. The old part contains considerable ore and is well opened up, and its product together with that of the new find will give the mine a place of considerable prominence in the list of iron properties of the Crystall Falls iron district.—[Diamond Drill.

A visit to the Peterson-Webber exploration, on section 24, 40-17, more than ever convinced the writer that the fortunate option-holders have a good thing. A shaft 6½ by 8 inside of timbers, now being sunk, was three feet in solid ore, the metal having been struck at a depth of 13 feet. The ore is as good looking stuff as has ever been seen in these parts. Adjoining the hanging wall there is a trench 92 feet in length entirely bottomed in ore at a depth of only three feet from the surface, and numerous pits here and there about the property are also in ore. Another shaft will soon be commenced at the north a 100 feet or more distant from No. 1, and Supt. Frank Webber is confident the property will develop into a mine of no small proportion.—[Florence Mining News.

Ore has been struck at the Foxdale, which is a few feet west of Humboldt mine. Explorations have been conducted by Capt. Buzzo, of the Saulisbury. The land is owned by Don M Dickinson, *et al.* Dickinson, by the way, is the *Democrat's* candidate for President—and is leased by an Ishpeming party who know a post hole from a mine, and who can tell pork from pig iron. They undoubtedly have a good thing. Time and lots of money have been expended upon this 40. Two years ago a series of holes were put down by diamond drill, and ore was cut dipping under a quartzite hill. The present shaft was then sunk between these holes with the above result. The ore is a continuation of the Humboldt ores going west, is a black magnetite and known to be in quite a large body. Strong lines of magnetic attraction run along here. We remember away back in 1868, while a clerk in the old Washington store, the late Mr. Breitung thought highly of the ground and almost had two or three men test pitting this region. This find shows that he was right.—[Lake Superior Democrat.

A second dividend for the new year of $1 a share has been declared by the Lake Superior Iron Co. The stock of the company, as well as Lake Angeline, which pays the usual $2 this month, is wanted.—[Lake Superior Democrat.

Messrs. Wagner and Connelly, of Marquette, are doing some extensive exploratory work on Section 16, south of the Milwaukee. They are sinking in an ore that carries about 55 in iron, and seems to improve as depth is attained. The prospect is entirely encouraging, and seems to warrant the prediction that a valuable mine will be opened at an early date.—[Negaunee Iron Herald.

Most of the men at the Humboldt were discharged on the 1st inst., and preparations made for the closing down the mine unless there shall be an early improvement in the market, which now seems improbable. The small force retained are engaged in hoisting ore already broken and in work about the stockpiles. The chances are that the pumps will be taken out and the workings prepared for an indefinite period of idleness.—[Negaunee Iron Herald.

World's Fair Notes.

Siam has decided to make an exhibit at Chicago, which shall eclipse the one it made at the Paris Exposition, where it carried off the honors in the oriental section.

Michigan will construct its building wholly of Michigan material, and will send it to Chicago in sections.

Henry B. Worthington has offered to furnish the Exposition, free of charge, pumps with a capacity of 40,000,000 gallons of water a day.

It has been decided to have the Machinery Annex an annex in fact instead of being an isolated structure as at first planned. The annex will adjoin Machinery Hall on the west. The entire structure will thus measure 500 by 1,400 feet, and be second in size only to the Manufacturers' Building, the dimensions of which are 788 by 1,688 feet. With its galleries, the latter building will have 40 acres of floor space.

A genius at Muhlenberg, Pa., has completed a marvelous clock for exhibition at the Fair. Around the dial is a railway track, on which a miniature locomotive makes the rounds every five minutes. It requires a magnifying glass to see the delicate machinery. The oil cups at the journals are so small that nothing larger than a hair can be inserted. There is a headlight and bell, flag-holders on the pilot, whistle, and everything connected with a locomotive. It has a link motion under the engine to reverse it. The weight of the locomotive is 1¼ pounds, and it has been named "The Gem."

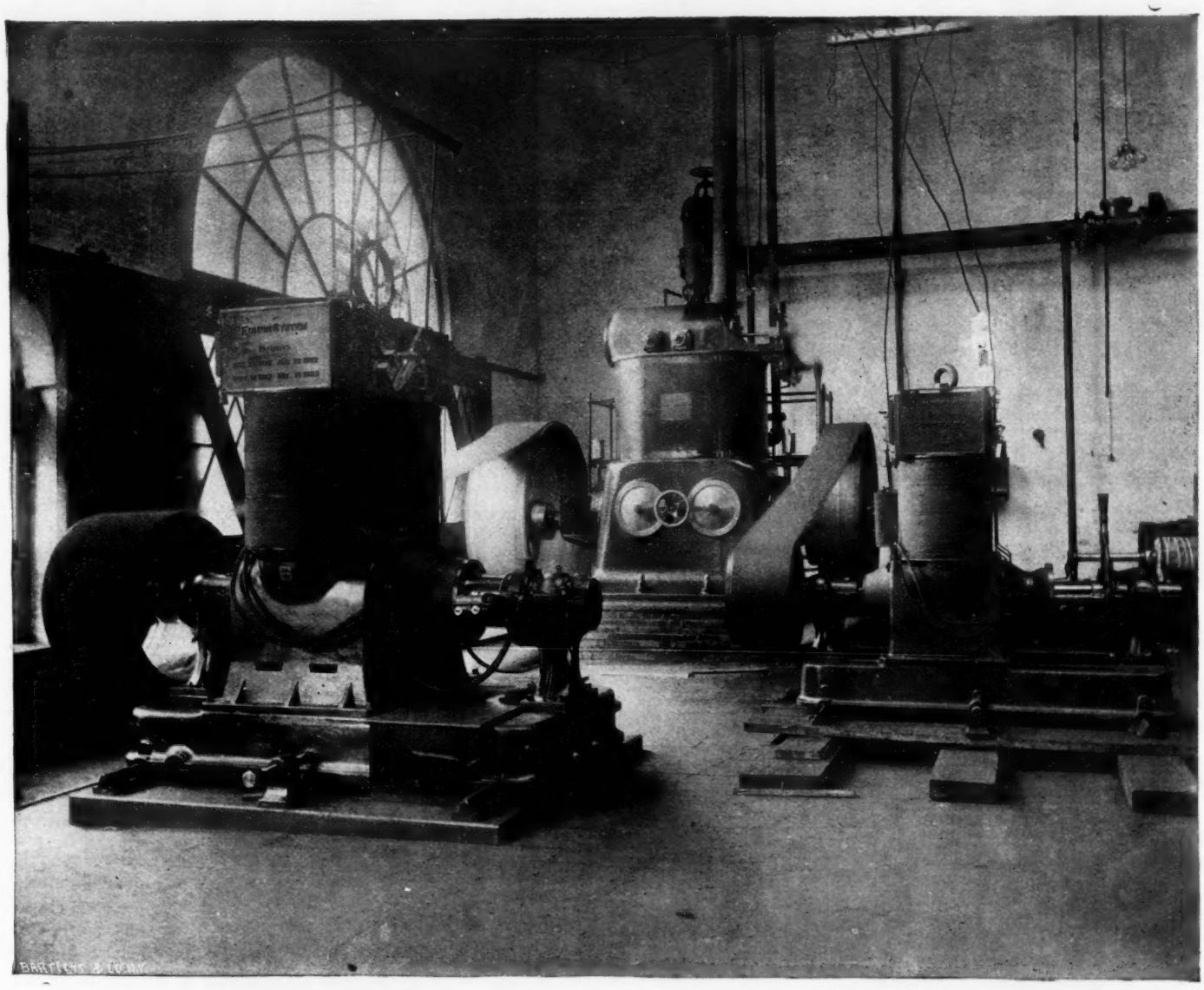
Early Ideas Regarding Railroads.

When a railroad was proposed from Boston to Albany, the Boston *Courier* of June, 1827, said: "Alcibiades, or some other great man of antiquity, it is said, cut off his dog's tail that quidnuncs might not become extinct from want of excitement. Some such motive, we doubt not, moved one or two of our natural and experimental philosophers to get up a project of a railroad from Boston to Albany, a project which every one knows, who knows the simplest rule in arithmatic, to be impracticable, but at an expense little less than the market value of the whole territory of Massachusetts, and which if practicable every person of common sense knows would be as useless as a railroad from Boston to the moon." A pious inhabitant of the Nutmeg State thanked God that he lived "in a hilly country, where it was impossible to build railroads." Now, the Air Line runs within a few hundred feet of his house.—[Boston Traveler.

IT begins to look as if the construction of the much-talked-of Hennepin Canal was to go on after a while, as proceedings for condemning land have been begun in the courts. Congress has authorized the construction of this canal, which is to connect the Illinois and Mississippi Rivers. The plans call for a channel eighty feet wide and seven feet deep.

A NOVEL POWER INSTALLATION.

We illustrate in this issue an example of the direct-belted dynamo in the system of subdivided and independent power now recognized by users of electrical machinery as more readily offering immunity from accident. The plant shown is complete in itself, and is the first of a series in the Station of the Federal Street & Pleasant Valley Electric Street Railway Co., Allegheny, Pa., intended to gradually replace their old complex system of centralized power with all its attendant evils of countershafting, clutches and belting. The engine is an 18 and 30 x 16 Westinghouse compound, whose govenor was recently the subject of interesting experiment on rapidity of adjustment with instantaneous changes of load. As originally intended, the combination consisted of a single 225 Watt-Edison dynamo belted direct from the engine: but the imposition of a second dynamo on the ngine, with increased steam pressure on account of the continued trouble with the other system, indicates the success of the change.



A MODEL POWER INSTALLATION.

Oil-Fed Puddling Furnaces.

The use of crude petroleum, as fuel in the puddling furnace seems on the point of becoming an established fact in the rolling mill practice of St. Louis. For some time past oil has been successfully used in the heating furnaces of some of the local mills, and this near approach to the puddling furnace, together with experiments elsewhere looking to its introduction therein, has prompted more or less investigation and study of the subject on the part of the local ironmasters. The St. Louis Stamping Co. in particular has taken a deep and active interest in the use of oil as a pudling furnace fuel. The extensive additions to their rolling mill plant, planned immediately after the passage of the McKinley bill and now nearing completion, increased their interest in oil as a supposedly economical fuel and determined them to give it a practical and thorough trial in the pudling department. To this end a contract was made with the Coates Oil Burner Co., of Terre Haute, Ind., and the tests made this week are the outcome of it.

The system worked by the Terre Haute Co., as is well known, is the patented invention of John T. Coates, president of the company, and the tests referred to were made at the Granite Iron Rolling Mills of the St. Louis Stamping Co., Second and Destrehan Streets. Tuesday's heats were witnessed in part by an *Age of Steel* representative, and were directed by Mr. John T. Coates personally. Others were equally successful we are advised, but the record given below relates to these in particular.

Five heats were gotten out at an average expenditure in time per heat of one hour and ten minutes; cost per heat, 15 cents; weight of iron to the heat, 520 pounds. Every heat was a success, and the work without incident. The oil-puddled iron behaved properly under the hammer and in the rolls, the foreman admiringly remarking, "It's all right."

The Coates system of oil burning is now working on a large scale at the Baldwin Locomotive Works, Philadelphia, Pa.; Pennsylvania Steel Co., Steelton, Pa., and locally at the plants of the American Air Brake Co., St. Charles Car Works, Madison Car Co., American Refrigerator & Transit Co., and elsewhere in the country in various establishments. It is altogether probable that the system will be extended to other puddling furnaces in the Granite Iron Rolling Mills.—[Age of Steel.

The Swelling of Steel.

It is well known that steel or iron will swell more or less when heated, but it is not so well known that this property can be made use of to good advantage at times. The crank-pin of an engine had been turned a trifle too small so that the fit could not be depended on if put in in the usual way. The crank-pin was small, so the loss would not have been great if it had been thrown away, but they were in a hurry for the engine and the time that would be lost was of more consequence than the price of a new crank-pin, but it was thought that they could save it by utilizing the swelling property of the steel. The crank-pin was heated a trifle and the surface covered with soap to prevent scaling, after which it was heated a little more, but not enough to redden it or raise a scale. After soaking at this heat for awhile it was cooled off and found to have swelled nearly enough to make a good driving fit. Another heating was given it. It was then found to have swelled all that was required and a little more than was necessary. The pin was then put into the lathe and the surface polished. The crank was heated and expanded by the heat of a gasoline blow pipe and the pin pushed into place, then both crank and pin were cooled down, and the job was found to be as good as though a new pin had been fitted. The job lasted for over two years and how much longer is not known.—[Stationary Engineer.

The Manchester Ship Canal.

According to Mr. E. Leader Williams, Engineer-in-Chief of the Manchester Ship Canal, England, the plant used on that work consisted of 97 steam excavators, 8 steam dredgers, 173 locomotives, 6,300 trucks and cars, 228 miles of single track railway, costing about $3 150 per mile, 124 steam cranes, 192 portable and other steam engines, and 212 steam pumps of all sizes. The maximum laboring force was 17,000 men and boys and 200 horses. The coal consumed amounted to 10,000 tons per month. The total excavation was about 46,500,000 cu. yds., including 10,000,000 cu. yds. of sandstone rock.

The World's Fair Excursions.

Mr. J. W. Butler, of Cleveland, who is so highly endorsed by leading general passenger agents for manager of excursions for the World's Fair, will Oct. 1 locate at 175 Dearborn street, Chicago, and in connection with excursions to that city, furnish fo tourists and strangers information, chaperons and guides for the many places of interest there, amusements, shopping, etc.

NEW GAS AND PETROLEUM MOTOR.

The problem of designing and perfecting a motor for small and medium powers, for universal use, is one that has received a great deal of attention from engineers and inventors; but many failures have been made in attempts to meet all the requirements of the case.

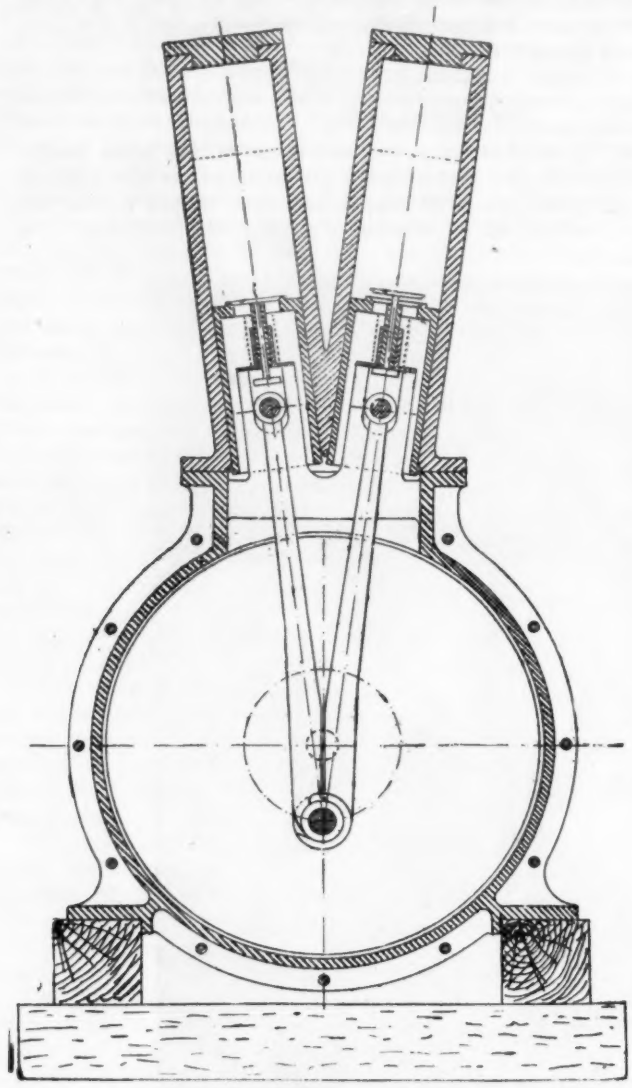


FIG. 1.—VERTICAL TRANSVERSE SECTION OF GAS AND PETROLEUM MOTOR.

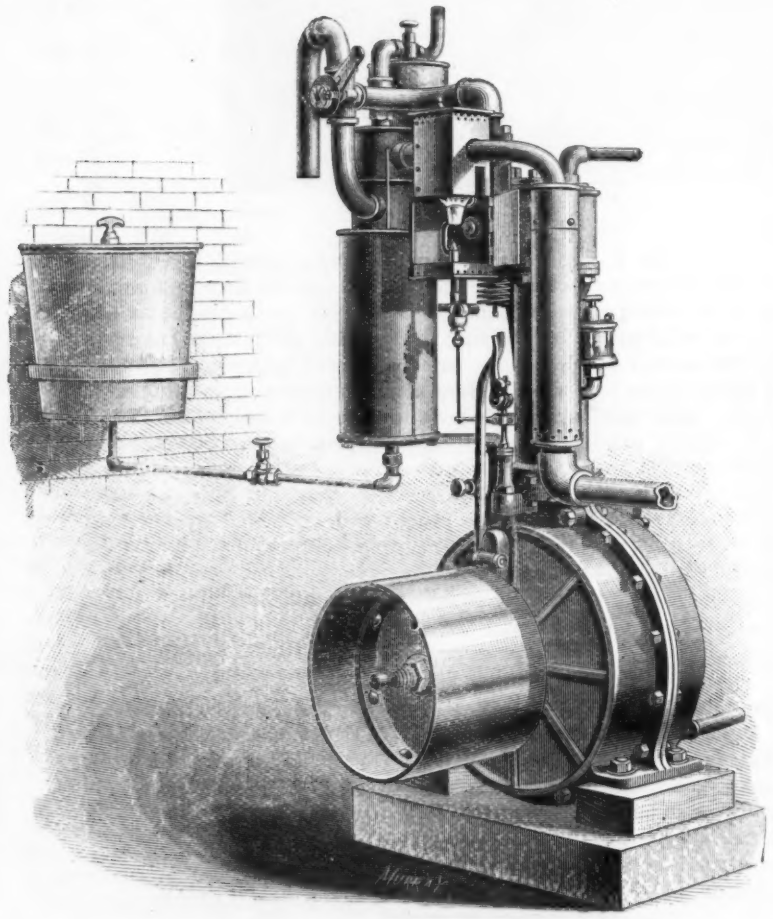


FIG. 3.—DAIMLER GAS AND PETROLEUM MOTOR.

The principal difficulty has been, not so much in the production of a working machine, as in designing a motor which is at once efficient, economical, safe, and capable of being used anywhere and by anyone, whether experienced in mechanics or not. A machine having these qualities is shown in the annexed engravings. It is a new gas and petroleum motor, the invention of Mr. Gottlieb Daimler, the eminent engineer, Cannstadt, near Stuttgart, Germany. These motors are built in sizes varying from one to ten horse-power, and

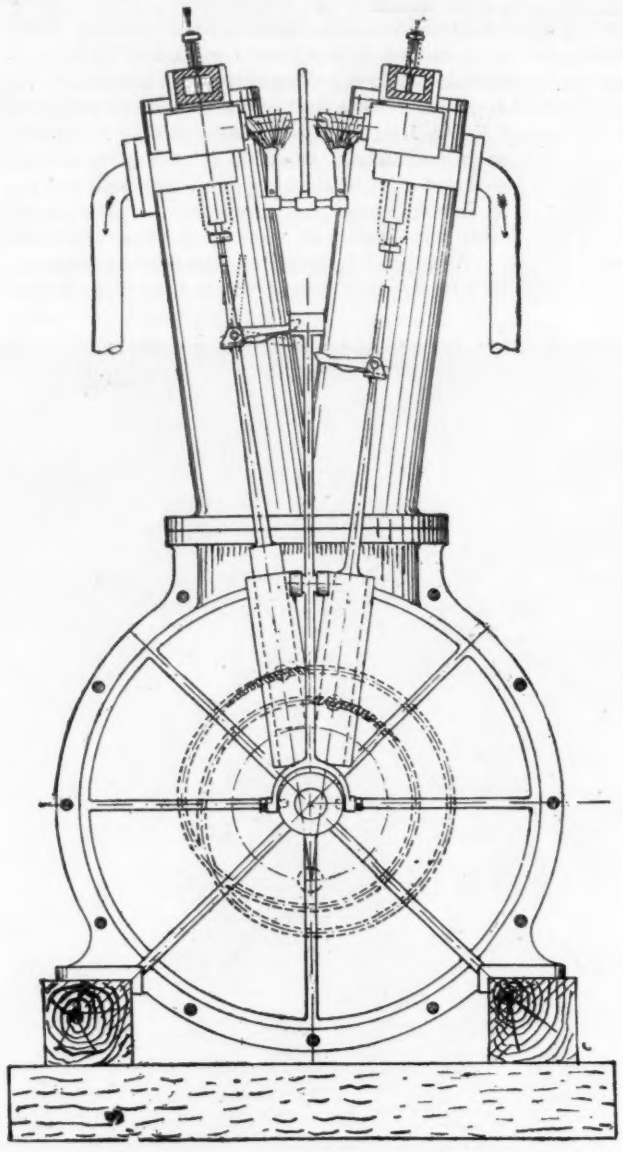


FIG. 2.—SIDE ELEVATION OF DOUBLE CYLINDER MOTOR.

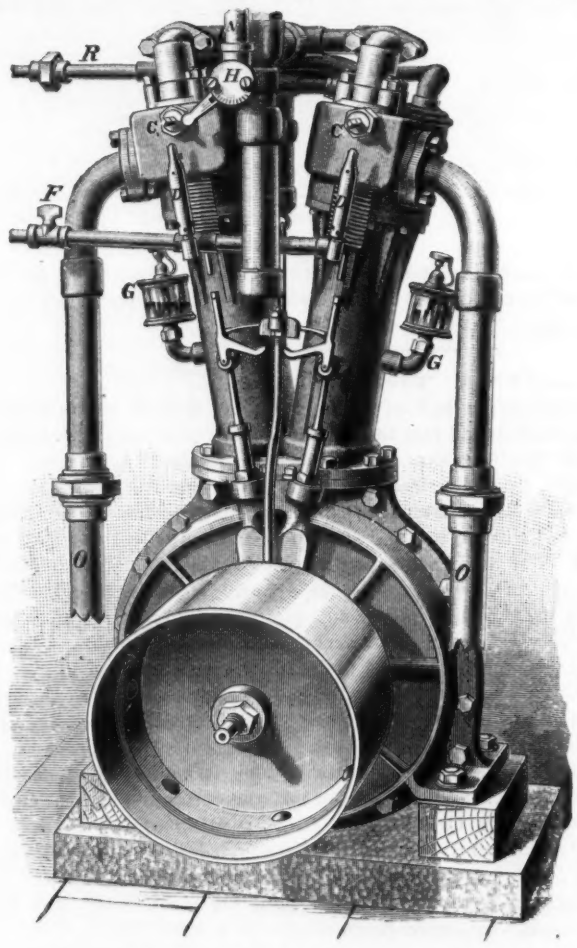


FIG. 4.—DOUBLE CYLINDER DAIMLER MOTOR.

in several modified forms to adapt them to various uses, the small industrial motors being designed for convenient connection with machines requiring only a small amount of power, say less than one horse-power, such as cream

separating machines, sewing machines, pumps, ventilating fans, watchmaker's machinery, light wood-working machinery, and for the use of amateur mechanics.

The larger sizes of the industrial motor are suitable for driving dynamos,

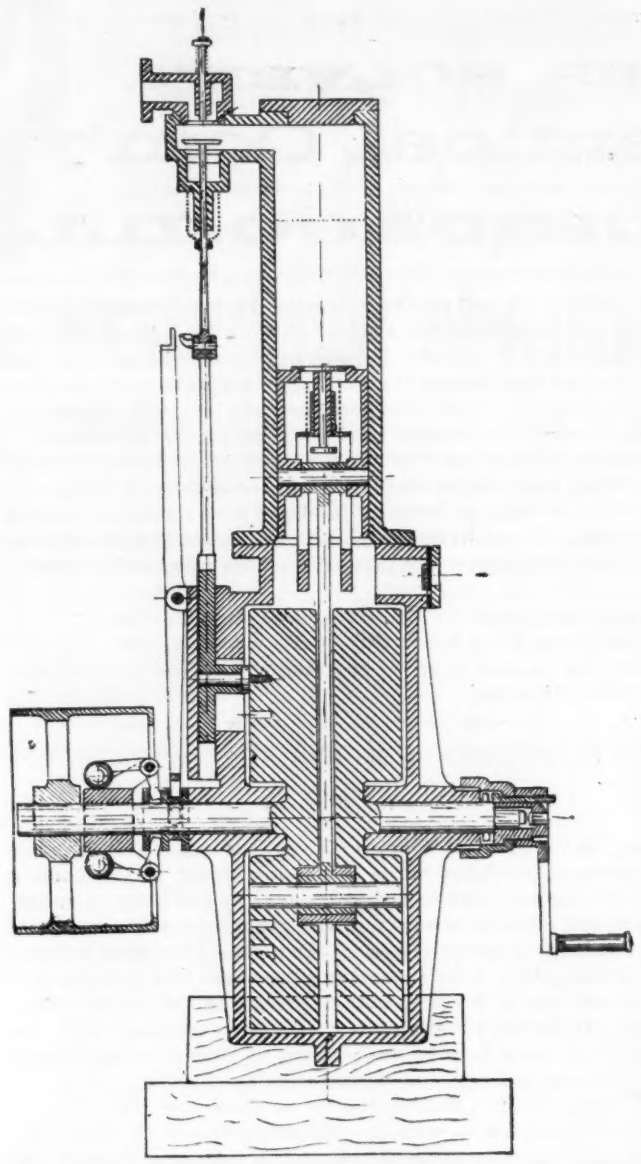


FIG. 5.—VERTICAL SECTION OF GAS MOTOR ON THE LINE OF THE SHAFT.

printing presses. elevators, grinding mills, etc.; while those adapted to boats and vehicles differ but little from those applied to other uses.

Although these motors are built with a view to durability, with all the parts proportioned to safely stand the working strain, they are by far the smallest and lightest motors of their class. They are designed to run at a high speed,

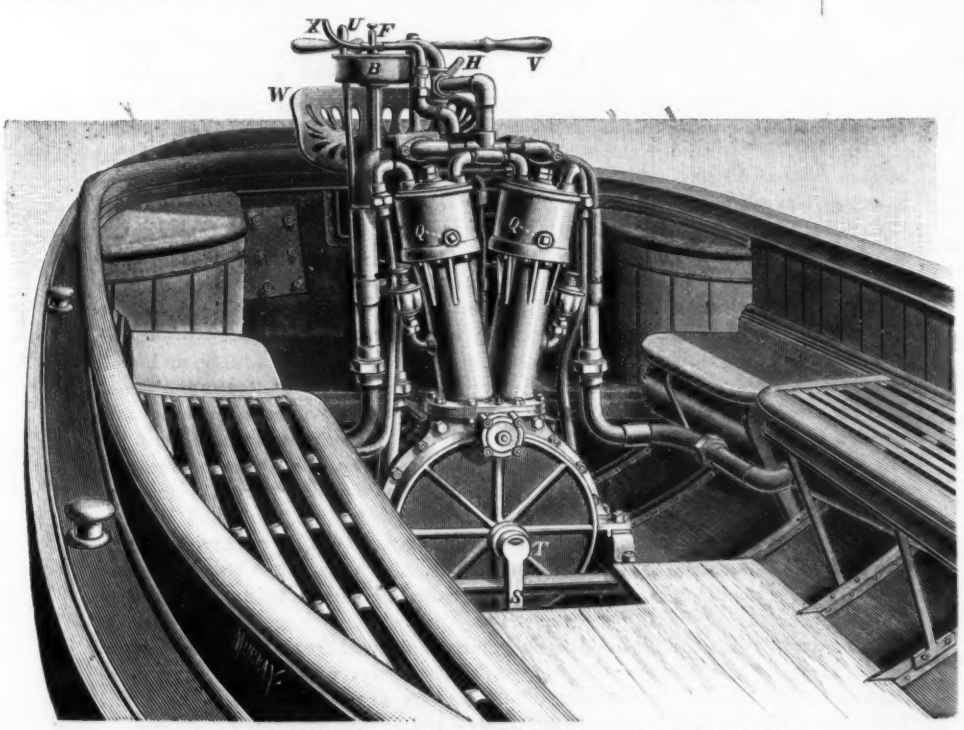


FIG. 7.—DAIMLER MOTOR APPLIED TO BOAT PROPULSION.

and are arranged so that they can be started in less than a minute, and may be run independently of either gas or water mains. When operated by petroleum gas, they run with still greater economy than ordinary illuminating gas

These motors are preferably made vertical, to economize space and reduce friction. In our engravings, Fig. 1 is a vertical transverse section of a double cylinder engine; Fig. 2 is an exterior view of the same; Fig. 3 is a perspective view of a single cylinder engine; Fig. 4 is a similar view of a double cylinder engine; Fig. 5 is a vertical section taken on a plane at right angles to the plane of Fig. 1; Fig. 6 is a diagramatic view of the gas-producing apparatus and Fig. 7 is a perspective view, showing the application of the motor to a boat.

The base of the motor consists of a cast iron gas-tight, circular chamber, with a valve inlet for combustible mixture of air. In the base are placed two disks, mounted upon the two sections of the main shaft and connected by a crank pin, the disks serving the double purpose of a crank and fly-wheels. In one of the disks is formed a double slip-cam groove, which passes twice around the crank shaft, and returns into itself. In this cam groove is placed a follower, which operates the valve gear so as to make every alternate stroke a working stroke.

Upon the base are mounted one or more working cylinders, according to the power required. When two cylinders are used, they are either arranged parallel with each other or jointed at the base so as to spread out at the top, forming a slight angle, as shown in Figs. 1, 2 and 4. Each cylinder contains a piston furnished with a valve for the transfer of air or gaseous mixture from the base, the valve being provided with a fork by which it is operated. It will be observed by reference to Fig. 1 that both the connecting rods of both pistons in the double cylinder engine are received upon the same crank pin. The space in the upper end of the cylinder above the piston is the explosion chamber, with which are connected the inlet and exhaust valves. All the valves used in this engine are of the type known as poppetvalves, these having been found in actual practice preferable to sliding or rotating valves. Every alternate stroke of the piston is a working stroke. During the up

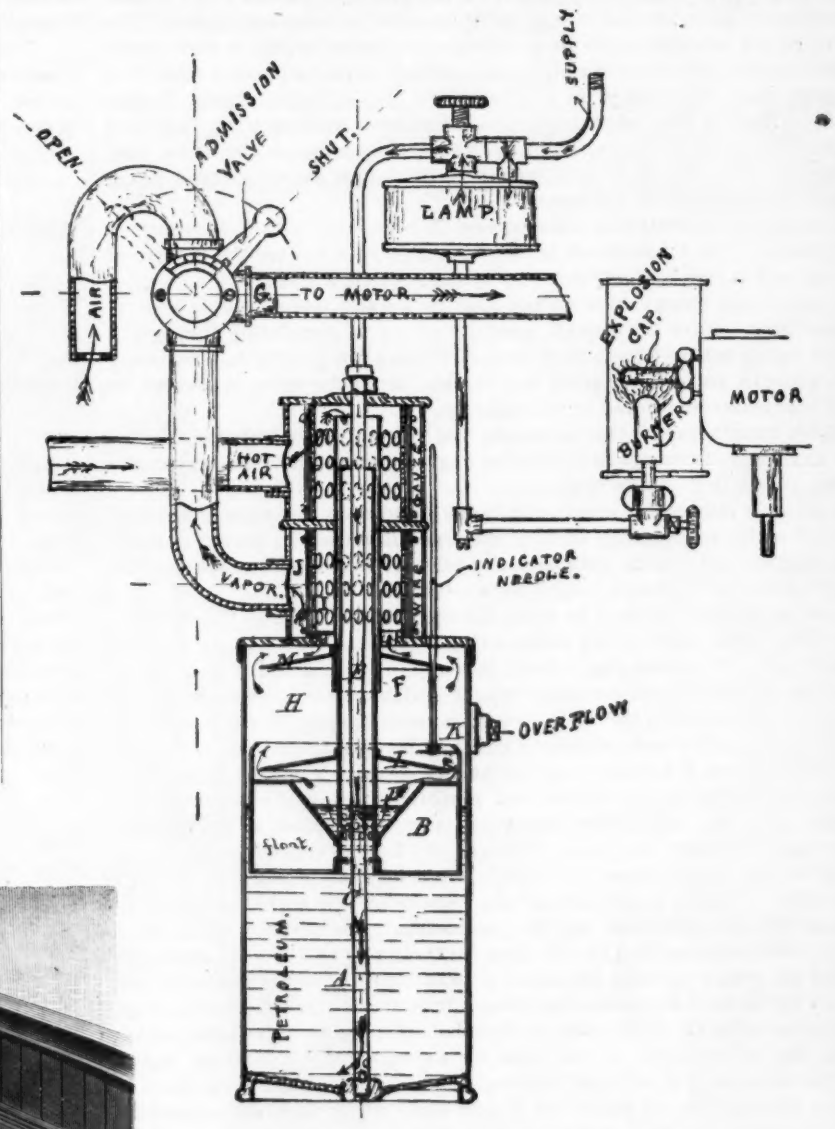


FIG. 6.—CARBURETING APPARATUS.

stroke of the piston, following the working stroke, a preliminary charge of air is drawn into the lower part of the working cylinder, from the crank chamber in the base, as the piston rises. At the same time, the upward movement of the piston forces the products of combustion from the explosion chamber through the exhaust valve, which is opened by the slip cam. During the following downstroke, the air in the cylinder below the piston is forced upwardly into the working part of the cylinder. At the same time a chargeof combustible gas is admitted, and the following upstroke of the piston compresses the explosive mixture in the explosion chamber, forcing it out into the capsule, C, projecting from the inlet valve chest, and this capsule being heated by the burner, D, ignites the explosive mixture, the expansive power of which forces the piston downward. The ignition of the charge is retarded until the crank is on the dead center, by the introduction into the ignition tube of a charge of mixture weaker than that contained in the cylinder. The speed of the engine is controlled by a sensitive governor contained in the pulley, and arranged to intermit the admission of combustible gas when the speed exceeds the normal. The movements of the piston, when no combustible

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mixture is introduced, resulting in simply compressing and recompressing the air contained in the cylinder.

By the order of operation adopted in this engine the power cylinder is emptied of most of the residual products of combustion and a purer charge of combustible mixture is used than possible with any other system. As a consequence the fuel, whether it be coal gas or petroleum vapor, is used to the best advantage and with the greatest economy.

The ingenious mechanism by which the necessary alternating motion of the valves is secured without the use of gearing is worthy of notice. In engines using gears for actuating the valves, the principal and most objectionable noise is the rumble and jarring of the gearing. In this engine there is no noticeable noise; in fact it may safely be called a noiseless engine. The inclosure of the working parts in a casing contributes largely to this result. This construction also insures a rigid base, which is an important item in a gas engine when the power is developed in the cylinder almost instantaneously. Besides this advantage, the chambered base secures in a very simple way the perfect lubrication of all the working parts, at the same time confining the oil so that it is economized to the fullest extent without being scattered about where it is not wanted.

The motor is lubricated by a single cup, G, connected with the lower part of the cylinder. The oil received in this manner falls toward the bottom of the casing, and is repeatedly thrown up by the revolving disks.

The explosion chamber is surrounded by a water jacket, and is kept at the proper temperature by a small quantity of water circulating through it, the water being taken from a tank and circulated by gravity in stationary engines, while in portable engines the circulation of the water is affected by means of a pulsometer worked by the exhaust.

By these simple means the necessary cooling of the cylinder is effected without any outlay for water in stationary engines, and without the consumption of any power in portable engines.

The motor is started by means of a crank handle on the main shaft, having a clutch which engages the shaft as the crank is turned in the act of starting the engine, and which automatically releases the handle as soon as the engine, after one or two turns, begins to run itself.

Where petroleum is used as fuel, the carbureter shown in Fig. 6 is employed. The lower part of the carbureting apparatus consists of a small petroleum tank, H, containing a float, B, which rests upon the petroleum. The float is provided with a central funnel which communicates with the main body of the liquid in the tank through a small opening at the bottom, so that while the liquid is maintained at a constant level in the funnel, it is practically isolated from the main body of the petroleum. The float is provided with an air tube entering the funnel, and perforated below the surface of the petroleum. This air tube slides freely in a tube, F, attached to the cover of the apparatus and acting as a guide, allowing the float to rise and fall, according to the supply of petroleum. Hot air is admitted to the carbureter through the pipe attached to the upper part of the apparatus, the air being heated in its passage to the carbureter by the products of combustion, which pass through a jacket surrounding the air pipe, on their way to the open air. The carbureted air passes through the vapor pipe in the direction indicated by the arrow, and unites with a stream of air drawn into the motor cylinder through the admission valve, G. This valve is provided with a graduated scale, which facilitates the adjustment. It has also an automatically operating safety valve. The reservoir, H, is filled through a supply pipe extending down to the bottom through the air tubes and float. The supply pipe communicates with the lamp font, which furnishes the fuel to the burner which heats the ignition capsule.

The time required for heating the capsule and starting the motor is only a minute or so. The motor is stopped temporarily in shutting off the supply of combustible gas, allowing the ignition burner to continue burning, but for a complete stop the ignition burner is extinguished in addition to shutting off the gas.

This motor is not only adapted for all stationary purposes, but has been applied very successfully to the propulsion of small boats, to operating street cars and trolleys, and to road wagons and carriages. The smallest tramway in the world is operated in the streets of Cannstadt, Germany. The car is driven by a one horse-power motor of this class. It will carry ten persons, and will run a mile in four minutes.

Boats driven by these motors are, during the season, in daily operation on Bowery Bay, north shore of Long Island City. Boats of the same class are running successfully on many of the lakes and rivers in Europe.

As this motor is readily supplied with fuel and is independent of water supply, it can be used in many places where a steam engine would be out of the question. It will undoubtedly be largely used for agricultural purposes, when it will find applications in thershing, grain cleaning, wood sawing, feed cutting, churning, cider making, and in many other ways which will suggest themselves to our readers. It will also be welcomed by small manufacturers all over the country, who are in need of a motor of this kind. Many of these power users have been obliged to make use of animal, or even hand or foot power. Others have used small steam engines, which are proverbially troublesome. We imagine an engine of the class described will be gladly adopted by the small manufacturers who are remote from the great centers of business.

Another application of this motor will undoubtedly be to pumping water for irrigation, for filling house tanks, and for railroad water supply tanks.

It would be a difficult task to describe in detail the numerous uses to which an engine of this kind can be applied, but it is possible that for isolated electric lighting it may find greater use than in anything else to which power is applied.

This motor is manufactured by the Daimler Motor Co., Nos. 937 to 941 Steinway avenue, Steinway, Long Island City, N Y, where motors from one to ten horse-power can be seen in actual operation. The New York office is at No. 111 East Fourteenth street.

"ALLEGED DECEPTIONS IN GERMAN STEEL WORKS" CORRECTED.

The proceedings in the Prussian courts of Essen, quoted in these columns, 8th inst., from a statement published on an erroneons report in the London *Iron and Steel Trades Journal*, were an action brought by the State to prosecute both the author and editor of a local partisan paper on charges of violation of the statutes regulating the privileges of the press. They were indicted for writing and promulgating articles assailing the honor and integrity of a number of citizens, residents of Bochum, both of private and of official standing, charging them with malice aforethought in incensory language with fictitious crimes against the fiscal laws for the purpose of disseminating hatred among the different classes and religious denominations of society and for inciting insurrection. One of the calumnies went to show that the Board of Assessors of Taxes, in connivance with the city authorities in all their numbers, including in their capacity as members of the Common Council the Director-General and some officers of the Bochum Verein, a society for mining and cast steel manufacture, to grossly undervalue the income of every one of their number, and many of their favorites, especially Protestants, some as high as 90 per cent., and to overestimate the people of the middle and lower grades of income, especially Catholics All the libeled parties appeared on summons as witnesses for the State with straightforward, clear and overwhelming testimony.

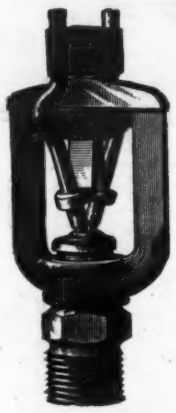
The author in his defense evinced great antagonism in violent attacks upon one person especially, the director-general of the steel works, Louis Barre, who stood ready to support separate and aggravating charges of outrages committed upon himself and the great industrial institute he represents. To impair his testimony the defendent charged him with using counterfeit stamps upon inferior and rejected rails and other railroad material, thus making it pass for good. The state's attorney finding that a denunciation to that effect had been made before a magistrate the day previous, temporarily withdrew the separate charges concerning offenses against Baare, in order to avoid delay by postponing the case pending the investigation of the new matter. The latter resulted in the dismissal of the deponent's charge, which during the further course of preceedings was declared unfounded. The defendants were convicted of all the charges preferred, found guilty, and sentenced to a term of imprisonment. Baare, in behalf of the Bochum Verein, had in the meantime deposited in court documentary evidence proving that stamps were regularly and legitimately made at the works upon order and for the proper use and convenience of contracting parties and their representatives, who stamped with them their tested material on acceptation.

The Prussian ministerial department of railroads has published since a table, showing from railroad statistics the accidents which occurred each of the last six years, numbering in all 2,672 cases, of which there was only one wherein a broken rail was a cause, and that only from being struck by a broken wheel.

Contradiction of the felonious charge has followed from railroads named in the same. The stenographic reports of the court proceedings, and state documents published in German official papers, are the sources of the aforegoing narration of this much abused affair.—[Scientific American.

Last of the Season.

Sept. 19th, the last Niagara Falls excursion of the season will be run over the Nickel Plate, Saturday night trip going; arriving at the Falls early the next morning. Same low excursion rate and ample accomodation in our Pullman palace day coaches and sleeping-cars. Ask nearest Nickel Plate Agts.



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DOUBLE STAND STEAM HAMMER

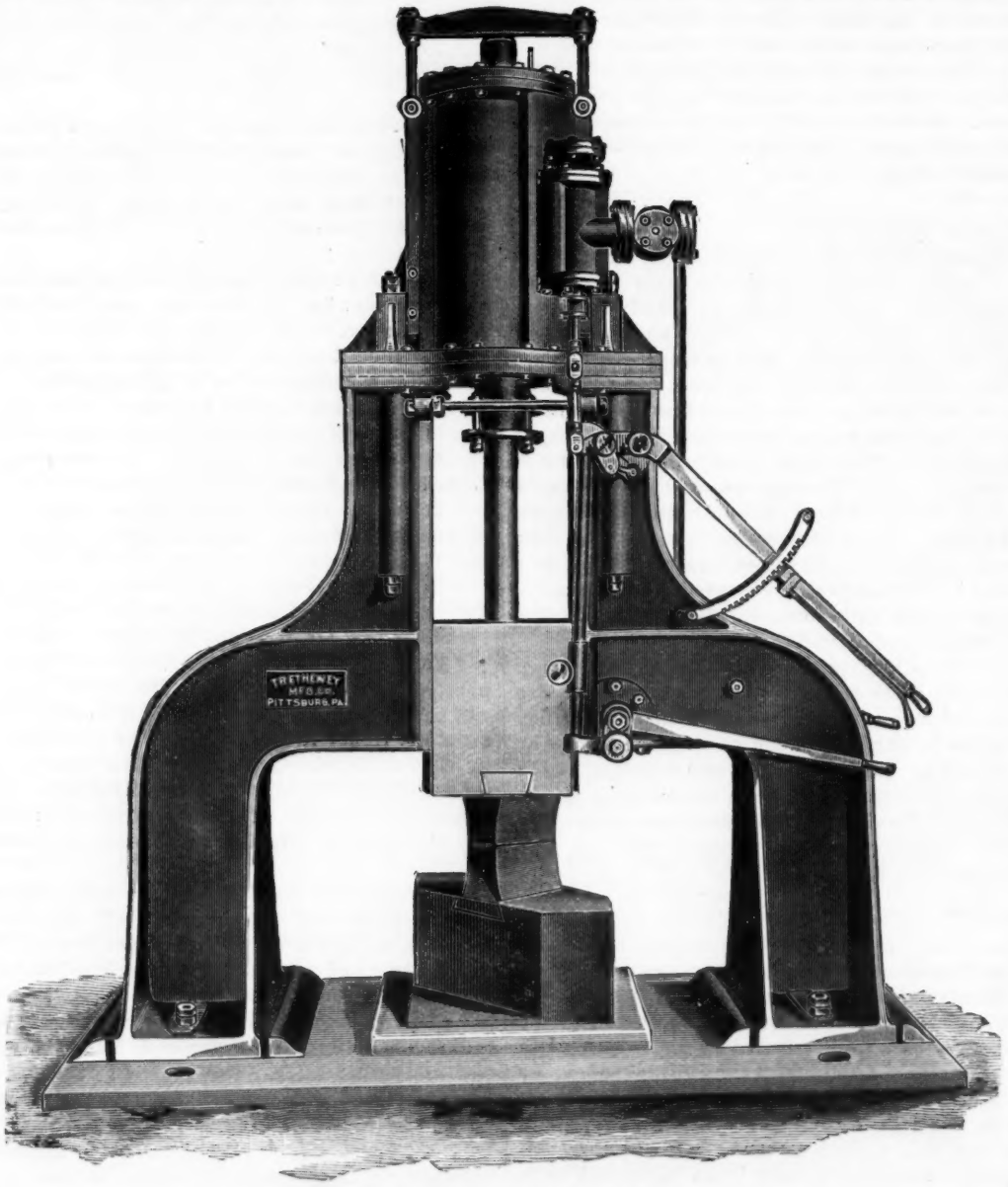
We present below an illustration of a double stand steam hammer built by Trethewey Manufacturing Co., of Pittsburgh, Pa. This hammer, which is the result of much careful study, is fitted with the builders' patent balanced piston valve, controlled by an adjustable slide bar which is made movable to give a greater or less travel to the valve as needed. The advantages claimed for the adjustable slide bar are

1st. The weight of the motion is carried on the stand.

2nd. The slide bar can be adjusted to any angle desired.

3rd. By use of the slide bar they are not dependent on the length of the ram to determine the length of the automatic stroke. The ram, therefore, can be made of any width desired. For this reason work, such as car axles and the like, now usually done on a helve hammer, can be done with this hammer made suitable for such work, and can be used just as well as any other work done by a steam hammer and thus save a large investment in tools for the various uses.

It is fitted with a handing lever by which a blow of any intensity within the compass of the hammer can be had at will. It has a stop to protect the cylinder in case of careless running or rod breaking. All parts are easily accessible which will be appreciated by those who have repaired steam hammers. All parts on which there is much wear are brass bushed. The ram and rod are of forged iron and the piston head of forged steel. The stands are solid web, heavily flanged which form is much more certain of proper strength than the hollow box stands in so common use. These hammers are made in sizes from 150 pounds upward to any required weight.



DOUBLE STAND STEAM HAMMER.

American Shipbuilding.

The builders of steel ships on the American lakes are reported to be strongly of the impression that the revival of shipping in the United States will be largely due to the progress made in naval architecture. The contracts which lake shipbuilders have successfully filled for ocean vessels have shown that they are able to meet the requirements of ocean service, and more contracts are going their way. They have shown remarkable enterprise in introducing the best known types of machinery, both for constructing and working vessels on the inland seas, and they have often been pressed with work when shipbuilders on the sea coast lacked orders. But the coast shipyards, both on the Atlantic and on the Pacific, have not stood still while the lake shipyards grew. The naval vessels which have been built on both oceans in the past few years show in their size, equipment and speed, what Americanbuilders can do when they have an opportunity.—[Iron and Coal Trades Review (London).

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FANS FOR VENTILATING!
ELECTRIC SUPPLIES.

BASIC STEEL MAKING AT EAST ST. LOUIS.

The St. Louis Steel Foundry, an enterprise growing out of the old Shickle-Harrison-Howard Iron Co., which divided up here some time ago, some of the parties in interest remaining in St. Louis, and others going to the South to establish a new plant, announces its readiness for business as a manufacturer of basic steel at its new plant on the East side. Every confidence is felt that the trial of the process will prove a success and it will be undertaken very shortly. This confidence would seem to be justified by the following report of a similar trial made at the Southern Iron Co.'s works, Chattanooga, a short time since, and published in the Chattanooga *Times:*

"The tests applied to some of the basic-Bessemer steel made at the experimental run at the Southern Iron Co.'s works, Monday, proved the process a success throughout, the product being a soft steel of superior quality. A small piece of the metal was hammered out flat to the thickness of about one-half inch and quenched in cold water while still red hot. It was then placed across an iron groove, a rod was placed across it and two burly negroes with heavy sledges belabored it. The steel bent without a break to the bottom of the groove. It was taken out, hammered flat and again placed on the groove to be bent in the opposite direction. Again it bent without breaking. This process was gone through with three times before the disk was broken, and the break was a beauty. The fibers seemed strained and twisted, and under the magnifying glass each fiber end had the appearance of a rope which had been broken by a heavy strain, the strand sticking out like a brush. Supt. Talbot is elated over this successful beginning, and speaks enthusiastically of future probabilities."—[Stove and Hardware Reporter.

Magnetic Driving Belts.

According to the reports of some of the electrical journals an attempt has been made by Mr. Edison to construct belting, the adhesion of which can be increased by the means of magnetism. Such belts are designed to be constructed of wire ropes passing over pulleys, their number and size being gauged by the amount of work the belt is to do. Strung across these ropes are a series of iron blocks or bars which are provided with holes through which the wire ropes pass. These holes are flared at their outer edges so that flexibility of the belting is obtained. The bars are properly spaced on the ropes by being made to pinch the rope tightly. This is achieved by drilling a small hole in the bar over the hole through which the rope passes, leaving a small amount of metal between the two so that it can be set down by means of a punch and in this way made to grip the rope. These belts are supposed to pass over iron pulleys, the bars making the contacts, and the pulleys are magnetized by a series of windings that are placed in circumferential grooves in the face of the pulleys. These windings are connected with small insulated rings on the shaft by means of which the current is transmitted to them.

We do not know whether Mr. Edison is really responsible for this design or not, but it appears to be a decidedly foolish one. Here are a number of wire ropes, a series of iron blocks spaced upon them by doubtful means, a pulley wound by insulated wires to make it magnetic, a source of electricity to be provided, and a great amount of useless mechanism, all to add a little adhesion to a belt. It really seems to ordinary mortals as if better results could be obtained by many of the practices in daily use, and that the above scheme is a useless and impractical invention.—[Railway Review.

A Rapid Annealing Furnace.

An annealing furnace having a very rapid action is announced as the outcome of the experience of Mr. G. Tomkinson, who for many years has been engaged in the designing and construction of such furnaces. It is applicable to sheet annealing, hollowware, malleable iron, sheet tin, or steel. In the case of sheet annealing the time is said to be reduced by 50 per cent., with other advantages. The furnace consists of four outer walls, within which, by the erection of two side walls and one end wall, is a second furnace or annealing oven. The flames and heated gases from the outer space pass through numerous perforations in the two side walls into the middle chamber, and after traveling through this space escape by bottom flues furnished with dampers to the chimney stack. Only one fire is used, and the pot containing the articles to be annealed is by this arrangement subjected to a uniformly distributed heat. Hence the pot does not suffer from undue strains or buckling, and lasts longer than usual. The uniform distribution of heat also accounts for the shorter time occupied by the annealing, and likewise causes a reduced fuel consumption. We understand that several of these furnaces are in successful use in the Midlands.—[London Iron.

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INDUSTRIAL SUMMARY.

New Enterprises:—

Andrew Hume is about to start a foundry at Brewster, N. Y.

Frank Lyman, it is said, contemplates the erection of an iron furnace at Covington, Va.

The citizens of Birmingham, Ala., have subscribed $102,000 towards a $1,000,000 steel plant.

A project is reported on foot at Chattanooga, Tenn., to manufacture iron by an electrical process.

J. P. Spiers & Co., of Worcester, Mass., will build a large shop for the manufacture of bicycles.

The Avonmore Foundry & Machine Co., of Avonmore, Pa., has been incorporated; capital, $70,000.

The Juniata Furnace & Foundry Co., of Philadelphia, has been incorporated, with a capital stock of $200,000.

L. H. Young, of Montreal, Can., is reported as having completed arrangements for the establishment of a nut-lock factory in Newport News, Va.

The Hanover Machine Works have been organized with a capital stock of $100,000, at Frederick, Md., for the purpose of manufacturing machinery.

The Cookshire Machine Works Co. is the name of a concern recently organized at Cookshire, Que., for the manufacturing of machinery, castings, etc.

The Pottsville Insulated Wire Co., of Philadelphia, have been chartered at Harrisburg, Pa., to manufacture insulated wire and cables and electrical appliances.

A movement is said to be on foot at Dubuque, Ia., to organize a company to take the place of the Iowa Iron Works, when that concern moves to St. Louis, Mo.

Columbia Supply Co., Chicago, has been incorporated to manufacture railway supplies; capital, $309,000; incorporators, C. D. Leach, C. A. Cox and John Francis.

The Blue Earth City Manufacturing Co. has been incorporated at St. Paul, Minn., for the manufacture of agricultural and domestic machinery. The concern has a capital stock of $20,000.

The George Car-coupler Co., Birmingham, Ala., recently incorporated, has for its purpose the introduction of a car-coupler invented by M. H. George. G. R. Harsh is Secretary of the company.

The Canda Manufacturing Co. is reported to have purchased a large tract of land at Carteret, N. J., on the line of the Central Railroad of New Jersey, on which a car manufacturing plant will be erected.

The Bristol Foundry & Machine Works has been organized at Bristol, Tenn. The capital stock is $25,000. Major A. D. Reynolds has been elected President, and Jas. B. Lyon, Secretary and Treasurer.

The Central Car Repair & Manufacturing Co., of Chicago, has been incorporated, with capital stock of $625,000, for the manufacture and repair of railway cars and specialties, and agricultural machinery and implements. Incorporators, Henry R. Pebbles, Norman S. Patton and Reynolds Fisher.

The Extensible Car Step Co. has been incorporated, with office at Kalamazoo, Mich., and capital stock of $100,000. The company will manufacture extensible car steps. The stockholders are: Hiram B. Peck, Kalamazoo; Milton E. Company, Hamilton; A. M. Granger and George S. Johnson, Grand Rapids.

The Montreal Metal Works has been incorporated at Montreal, Canada, with a capital stock of $50,000, and will manufacture and deal in wires, rods, cables, and every description of apparatus and metals used in connection with the business of telephone, telegraph, electric lights, electric railway, cable companies, etc.

The Cincinnati Milling Machine Co. has completed its new factory in the Mill Creek Valley. The company's lot is 120x130 feet, and the building 50x130, two stories, of brick. The constant increase of business has compelled a move to larger quarters. As the company makes very heavy machines, ample ground floor space is necessary.

Additions, Enlargements, Removals, etc.:—

The Vulcan Iron Works will erect a new boiler shop at West Pittston, Pa.

The Burton Heater Co., Richmond, Va., will, it is stated, enlarge its heater works.

An addition is to be built to the works of the Victoria Cordage Co., at Dayton, Ky.

The George B. Smith Foundry Co., Boston, Mass., will erect a new brick foundry 184x86 feet.

The Delaware & Hudson Canal Co. is to improve the facilities of its repair shop at Whitehall, N. Y.

The Ferracute Machine Co., of Bridgeton, N. J., has recently built a new

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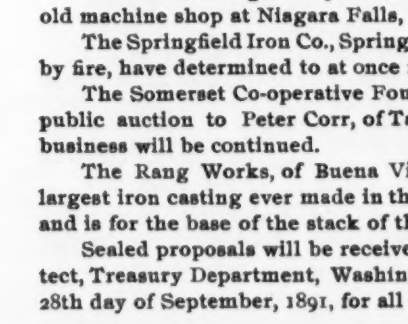

erecting shop and added several new machines. Some very heavy punching and shearing machines for bridge and girder work are among the work at present on hand.

The Pittsburgh Locomotive Works will add a large machine shop to its works in Allegheny, Pa.

The Southern Engine Boiler & Works Co., Jackson, Tenn., will build a new boiler house 65x100 feet in size.

The Canton Roofing Co., of Canton, O., contemplates the establishment of branch roofing works in Roanoke, Va.

The New York Manufacturing Co., of Saco, Me., is to add new automatic machinery to their finishing department.

At Clarksburg, W. Va., A. H. Osborn will rebuild at once his foundry and machine shops, recently destroyed by fire.

Some new machinery, including engine, boiler, etc., is to be placed in the Metropolitan Street Railway Co.'s plant at Macon, Ga.

The Fabric Fire Hose Co., Warwick, N. Y., has increased its capital from $100,000 to $200,000, and contemplates enlarging its plant.

The Linwood Iron Works Co., Linwood, Pa., will shortly build a new machine shop and foundry, of double the capacity of the present plant.

The Wright Steel Shovel Works are to remove their plant from Beaver Falls, Pa., to Anderson, Ind. One hundred and fifty men will be employed.

The Belden Machine Co., of New Haven, Conn., is constructing a new four-story brick building, 190x93 feet. The new machine shop will be fitted with the latest improved machinery.

The new shops of the New York Central at West Albany, N. Y., to replace those burned last May, are nearing completion. Considerable new shop equipment will be purchased.

Fires and Accidents:—

The foundry of Henry Glocker & Co., Grand Haven, Mich., has been destroyed by fire.

The galvanizing department of the Britton Iron & Steel Works, Cleveland, was destroyed by fire. Loss, $20,000; insured.

At Allentown, Pa., L. H. Kinney's foundry facings mill, owned by William Weightman, was destroyed by fire. Loss to Weightman, $10,000; to Kinney, $4,000; total insurance, $4,000.

General Industrial Notes:—

Thomas McGarigle and John Sweeney have purchased Phillpot & Leuppie's old machine shop at Niagara Falls, N. Y.

The Springfield Iron Co., Springfield, Ill., whose mill was recently destroyed by fire, have determined to at once rebuild their plate mill on a larger scale.

The Somerset Co-operative Foundry, at Somerset, Mass., has been sold at public auction to Peter Corr, of Taunton, for $9,300. It is reported that the business will be continued.

The Rang Works, of Buena Vista, Va., made what is claimed to be the largest iron casting ever made in that State, recently. It weighs 26,000 pounds, and is for the base of the stack of the furnace, at Iron Gate, Va.

Sealed proposals will be received at the office of the Supervising Architect, Treasury Department, Washington, D. C., until two o'clock P. M., on the 28th day of September, 1891, for all the labor and materials required for the iron stairs, iron work, etc., of elevator shaft, for the United States Court House Post Office, etc., building at Denver, Col.

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Fuel Gas by the Rose Process.

The National Heat & Power Co. has been making experiments during the last two years at the Bellefonte Iron & Nail Co.'s mill, Bellefonte, Pa., in puddling iron with fuel gas made by the Rose process, and finally have succeeded in solving the problem to their satisfaction. During the week ending August 29th, they puddled 40,950 lbs. of iron with a consumption of 359.543 feet of gas. This represents all the gas burned during the week, including the amount used in keeping the furnace hot between turns, the mill only running double turn. This is an average of 19,600 feet to the ton of iron. Some remarkable work was done during this run. For instance, one heat (1,050 lbs.) was puddled with 5,230 feet of gas, and several heats with less than 8,000 feet each. The cost of gas per thousand feet with coal $1 50, coke $2.25 per ton and oil 2¼ cents per gallon, was 6⅔ cents. With fuel at Pittsburgh prices it can be produced for five cents per thousand feet; thus bringing the cost of puddling down to $1 per ton. These figures can be verified. Messrs. Carnegie, Phipps, & Co., Limited, sent Mr. T. B. Lee, mechanical engineer, Pittsburg, to make a thorough investigation of the process. After making a test extending over a period of five weeks, he made a favorable report, and upon the strength of this they have secured the right to use the Rose process, in all of their mills, and have ordered a plant with a capacity of running six puddling furnaces, erected in their Thirty-third Street mill, at once; upon the completion of which, they will give it a thorough test in puddling and heating furnaces with a view of adopting it for use in all their furnaces.

The National Heat & Power Co., 419 Walnut St., Philadelphia, of which Gen. D. H. Hastings is President, controls the patents. They claim to make a fixed gas that can be piped any distance, and, with the addition of 1½ gallons of Lima oil to the thousand feet, to make illuminating gas of 20 candle-power. If these are facts, our iron industries will be able to get a substitute for natural gas, and will be saved the trouble and expense of returning to coal as a fuel.

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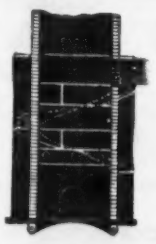
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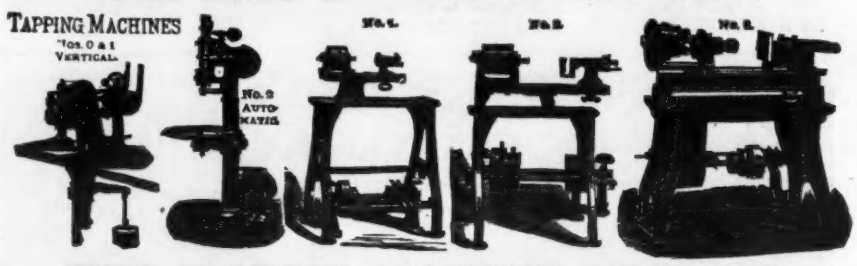

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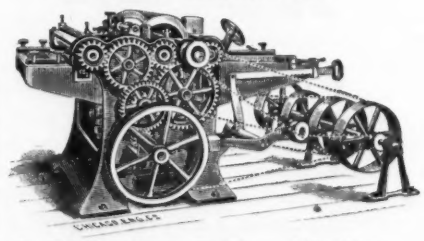

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PIG IRON.

CLEVELAND (f. o. b. cars, net cash) Bessemer, $17 30; No. 1 Foundry, $16 80; No. 2 Foundry, $15 80; No. 1 Gray Forge, red short, $14 80; No. 2 Gray Forge, neutral, $14 30; No. 1 American Scotch, $16 80; No. 2 American Scotch, $15 80.

CHICAGO (reported by Messrs. Rogers, Brown & Merwin): Southern Coke No. 1 foundry, $16 25 @17 00; Southern Coke No. 2 Foundry, $15 25 @16 00; Southern Coke No. 3 Foundry, $14 75 @15 50; Southern Coke No 1, Softeners, $15 25 @16 00; Southern Coke No. 2, Softeners, $14 50 @15 25; Ohio Silveries No. 1, $17 50@18 50; Ohio Silveries No. 2, $16 50@ 17 50; Ohio Strong Softeners No. 1, $18 00@19 00; Ohio Strong Softeners No. 2, $17 25@18 25; Lake Superior Charcoal Nos. 1 to 6, $17 75@18 50; Tennessee Charcoal No. 1, $18 00@19 00; Tennessee Charcoal No. 2, $17 00@18 00; Southern Standard Car Wheel, $21 00@23 00; Tennessee Standard Car Wheel, $00 00@00 00.

CINCINNATI (reported by Rogers, Brown & Co.): FOUNDRY IRONS—Southern Coke, No. 1 foundry, $14 75@15 25; Southern coke, No. 2 and No. 1 soft, $13 75@$14 00; Hanging Rock Coke, No. 1 foundry, $16 50@17 50; Jackson Co. Stone Coal, No. 1 foundry, $16 50@17 00; Tennessee Charcoal, No. 1 foundry, $16 50@17 50; Hanging Rock Charcoal, No. 1 foundry, $20 00 @22 00. MILL IRONS—Standard Southern Coke, grey forge, $12 50@12 75; Standard Southern Coke, mottled, $12 25@12 50; Cold Short Southern Coke, grey forge, $12 75@13 00; Strong Ohio Neutral Coke, grey forge, $15 00@15 50. CAR WHEEL AND MALLEABLE—Standard Alabama Car Wheel, $19 50@20 50; Tennessee Car Wheel, $18 00@19 00; Lake Superior Car Wheel, $19 50@20 50.

BUFFALO (reported by Rogers, Brown & Co.): Mahoning and Shenango Valley strong, No. 1 Foundry, $16 50@00 00; Mahoning and Shenango Valley strong, No. 2 Foundry, $15 50 @00 00; Ohio Softener No. 1, $16 50@00 00; Ohio Softener No. 2, $15 50@00 00; Jackson Co., Silvery No. 1, $18 00@00 00; Jackson Co. Silvery, No. 2, $17 00@00 00; Lake Superior Charcoal, $18 25@00 00; Tennessee Charcoal, $17 50@19 00; Southern Softener No. 1, $16 00@00 00; Southern Softener No. 2, $15 25@00 00; Southern Strong No. 1 Foundry, $16 75@00 00; Southern Strong No. 2 Foundry, $16 00@00 00' Alabama Car Wheel, $22 00@22 50; Hanging Rock Charcoal, $23 00@24 00.

LOUISVILLE (reported by Hall Bros. & Co.) HOT BLAST FOUNDRY—Southern coke No. 1, $14 25@14 50; Southern coke No. 2, $13 50@14 00; Southern coke No. 3, $13 00@13 25; Mahoning Valley (Lake ore mixtures), $00 00@00 00; Southern charcoal, No. 1, $16 00@17 00; Southern charcoal, No. 2, $15 50@16 00; Missouri charcoal, No. 1, $17 00@17 50; Missouri charcoal, No. 2, $16 50@17 00. FORGE—Neutral coke, $12 50@12 75; Cold short, $12 25@12 50; Mottled, $11 75@12 00. CAR WHEEL AND MALLEABLE—Southern (standard brands), $19 00@ 19 50; Southern (other brands), $17 00@18 00; Lake Superior, $20 00@21 00.

ST. LOUIS (reported by Rogers, Brown & Meacham): HOT BLAST COKE AND CHARCOAL—Southern Coke No. 1, $15 50@15 75; Southern Coke No. 2, $14 50@14 75; Southern Coke No. 3, $13 75@14 00; Southern Grey Forge, $13 25@ 13 50; Southern Charcoal No. 1, $17 25@17 75; Southern Charcoal No. 2, $16 75@17 25; Missouri Charcoal No. 1, $15 50@16 00; Missouri Charcoal No. 2, $15 00@15 50; Ohio Softeners, $18 00@ 19 00. CAR WHEEL AND MALLEABLE IRONS—Lake Superior, $19 50@20 00; Southern, $19 50@ 20 00. CONNELLSVILLE COKE—East St. Louis, $0 00; St. Louis, $5 65

DETROIT (reported by William F. Jarvis & Co): Lake Superior Charcoal, all Numbers, $18 00@18 50; Lake Superior (coke) Bessemer, $17 75@18 50; Katahdin (Maine charcoal), $00 00 @00 00; Lake Superior Coke, Foundry, all ore, $17 50@18 00; Lake Superior Coke, Foundry, all ore, $00 00@00 00; Standard Ohio Black Band, $18 00@18 50; Southern No. 1 $16 25@16 50; Southern Gray Forge, $14 00@ 14 50; Jackson County (Ohio) Silvery, $18 00@ 18 50; Old Car Wheel, $00 00@00 00. Connellsville Coke, $0.00.

LOUISVILLE (reported by Geo. H. Hull & Co): Southern Coke No. 1 Foundry $14 50@ 15 00; Southern Coke No. 2 Foundry $13 75@ 14 25; Southern Coke No. 3 Foundry $13 25@ 13 75; Grey Forge, $12 75@13 25; Southern Coke Silver Grey, $00 00@00 00; Southern Charcoal No. 1 Foundry, $16 00@17 00; Car Wheel, $18 50@20 00.

PITTSBURGH (reported by A. H. Childs): No. 1 Foundry, $16 00@16 25; No. 2 Foundry, $15 00@15 25; Grey Forge, $14 00@14 25; White and Mottled, $13 25@13 50; Warm Blast Charcoal, $18 00@20 00; Cold Blast Charcoal, $22 00 @27 00; Bessemer, $15 75@16 00.

MERCHANT IRON AND STEEL.

Flat Bar

1½ to 4 by ½ to 1 inch	1 80
4½ to 6 by ½ to 1 inch	1 90
1½ to 6 by 1¼ to 2 inch	2 20
1½ & 1¾ by ½ to ¾ inch	1 90
1 & 1¼ by ½ to ¾ inch	2 00
⅝, ¾ and ⅞ by ½ to ½ inch	2 20

Round and Square.

1 to 1⅞ inch	1 80
2 to 2½ inch	2 00
2¾ to 3¼ inch	2 30
3½ to 4 inch	2 80
4¼ to 4½ inch	3 30
4¾ to 5 inch	3 50

Oval.

½ to 1¼ inch	2 20
⅝ to ¾ inch	2 40
⅞	2 60
1	3 00

Half Oval and Half Round.

1¼ to 3 inch	2 90
⅝ to 1¼ inch	2 50
½ to ¾ inch	3 10
⅜	3 30
¼	4 80

Heavy Band.

¼ to 6 by ¼ and 5-16 inch	2 00
¼ to 1¼ by ¼ and 5-16 inch	2 10
⅝ to ⅞ by ¼ and 5-16 inch	2 30
½ to ¾ by ¼ and 5-16 inch	2 80

Hoops.

1¼ to 4, Nos. 13 to 15	2 60
1¼ to 2, Nos. 16 to 18	2 70
1¼ to 2, No. 19	2 80
1¼ to 2, No. 20	2 90
1¼ to 2, No. 21	3 00
1¼ to 2, No. 22	3 10
15-16, 1 and 1¼, Nos. 13 to 15	2 80
15-16, 1 and 1¼, Nos. 16 to 18	2 90
15-16, 1 and 1¼, Nos. 19 and 20	3 00
15-16, 1 and 1¼, No. 21	3 10
15-16, 1 and 1¼, No. 22	3 20
⅞, Nos. 13 to 15	3 00
⅞, Nos. 16 to 18	3 10
⅞, Nos. 19 and 20	3 20
⅞, No. 21	3 30
⅞, No. 22	3 40
13-16, Nos. 13 to 15	3 20
13-16, Nos. 16 to 18	3 30
13-16, Nos. 19 and 20	3 40
13-16, No. 21	3 50
13-16, No. 22	3 60
¾, Nos. 13 to 15	3 30
¾, Nos. 16 to 18	3 50
¾, Nos. 19 and 20	3 60
¾, No. 21	3 70
¾, No. 22	3 80
11-16, Nos. 13 to 15	3 50
11-16, Nos. 16 to 18	3 70
11-16, Nos. 19 and 20	3 80
11-16, No. 21	3 90
11-16, No. 22	4 00
⅝, Nos. 13 to 15	3 80
⅝, Nos. 16 to 18	4 00
⅝, Nos. 19 and 20	4 10
⅝, No. 21	4 20
⅝, No. 22	4 30
⅝, No. 23	4 50

Light Band.

1¼ to 6 by ¼ to 3-16 in	2 20
1¼ to 6 by Nos. 11 and 12	2 30
1 to 1¾ by ¼ to 3-16 in	2 40
1 to 1¾ by Nos. 11 and 12	2 50
⅞ and 13-16 by ¼ to 3-16 in	2 70
⅞ and 1 3-16 by Nos. 11 and 12	2 80
¾ and 11-16 by ¼ to 3-16 in	3 00
¾ and 11-16 by Nos. 11 and 12	3 10
⅝ and 9-16 by ¼ to 3-16 in.	3 30
⅝ and 9-16 by Nos. 11 and 12	3 40
½ by ⅜ to 3-16 in	3 60
½ by Nos. 11 and 12	3 70

Wagon Box Iron.

¾ inch, beveled edge, by Nos. 11 and 12	2 80
¾ inch, " " " 13 and 14	3 00
¾ inch, " " " 11 and 12	3 10
¾ inch, " " " 13 and 14	3 30

Sheet Iron:

No. 10 to 14	2 65
No. 15 to 17	2 75
No. 18 to 21	2 99
No. 22 to 24	3 15
No. 25 to 26	3 30
No. 27	3 40
No. 28	3 50

Iron Boiler Plates.

Tank, ¼ inch and heavier	2 60
C No. 1, " "	2 85
C H No. 1 " "	3 10
C H Flange, " "	3 85
Extra Flange, "	4 85
Solid Fire Box "	5 10

Steel Boiler Plates—1-4 in. and Heavier.

Tank	2 75
Shell	3 15
Flange	3 45
Marine Flange	3 85
Fire Box	4 55

Above includes plates 90 inches wide.

90 to 96 in. wide	¼c ℔ extra
96 to 100 in. wide	1 c "
100 to 104 in. wide	1¼c "
104 to 116 in. wide	special

American Cast Tool Steel.

ROUND, SQUARE AND OCTAGON.	cts. ℔s
1 to 2 in. inclusive	09
9-16 to ½ in "	09
7-16 to ⅝ and 2⅜ to 3 in	10¼
3⅛ to 4 in	11
⅝ to 11-16 and 4⅛	10¼
⅛ to 6 in	11¼
¼ to 9-32 and 6⅛ to 7 in	12
3-6 in	14

Flats.

	cts. ℔s
2 to 9-16 wide by 2 to ⅛ thick	8

Bessemer and O. H. Steel.

Machinery	base price,	2 75
Tire	"	2 75
Spring	"	3 25
Sleigh Shoe	"	2 75
Toe Calk	"	3 00
Cutter Shoes, tapered and burr.	"	3 00

English Tool Steel.

Jessop's	16c
Hobson's "Best"	16c
" "Choice"	36c

Burden Boiler Rivets.

⅜, ½, 11-16 and ⅝ inches diameter	4 00
Bridge ⅜, ½, 11-16 and ⅝ inch diam	4 00

SCRAP IRON AND OLD METAL.

NET TONS	
No. 1 R. R. wrought scrap	$18 00
No. 1 wrought scrap	16 50
No. 1 Machine cast scrap	11 50
Iron axles	23 50
Axle turnings	13 50
Wrought turning (free from cast)	11 50
Cast borings	8 00
Uncut wrought iron boilers	11 50
Steel boiler plates	16 00
Grate Bars	8 00
Pipes and flues (Clean)	12 00
Tank iron	12 50
Hoop and band iron	9 50
Sheet iron	8 50
Wrought drillings	11 00
Malleable iron	9 50

Reported by Messrs. BLACK & POLLOCK, Cincinnati, O.:

Railroad Wrought	$20 00
No. 1 Country Wrought	17 00
Stove Plate	8 75
Machine Castings	11 00
Hoop and Sheet	8 00
Casting Borings	9 00
Wrought Turnings	8 00

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Squared Roofing Sheets a Specialty.
CAMBRIDGE REFINED IRON. TRADE MARK
CAPACITY RANGES FROM No 30 26 INCHES WIDE TO 1-4×40×120
CAMBRIDGE SOFT STEEL. TRADE MARK
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MANUFACTURERS OF
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Blooms and Billets, Steel Angles, Forgings, Bar and Spring Steel Steel Street Rails, Steel Oil Barrel Hoops, Wire of all Kinds, Iron and Steel Boiler Plates, Galvanized and Black Sheet Iron, Corrugated Iron Roofing, Sheet Steel.

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CLEVELAND, O.

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MINERS AND SHIPPERS OF
Ohio Steam Coal and Coke.
Mines on the Cleveland, Lorain & Wheeling R. R. Capacity, 3,000 tons daily.
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OFFICE + FURNITURE.
Interior Work a Specialty.
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MACHINERY SUPPLY MARKET.

Anvils.

American ..... ₩ lb 9@10
Wrights ..... ₩ lb 12

Bellows.

Blacksmiths' { Hill's ..... dis 40
Bullock's .... dis 50&10
Moulders' ..... dis 40@40&10
Hand ..... dis 40&10@50

Belting.

Boston Belting Co's standard ..... dis 70
" " " extra ..... dis 60&5
" " " best ..... dis 55
Hoyt's Short Lap ..... dis 45
Cleveland Rubber Co. extra standard dis 60&10
Shults Raw Hide Leather Belting, single, ... dis 40
Shults Raw Hide Leather Belting, double, and Light Double ..... dis 40
Standard, oak tanned ..... dis 50&10
Alexander Brothers' pure oak tanned. ... dis 45

Blowers and Exhausters.

B. F. Sturtevant's ..... dis 20
Boston Blower Co. ..... dis 35
Buffalo ..... dis 15

Borax.

..... ₩ 12

Chalk.

White ..... ₩ gross 30
White Crayon ..... ₩ gross 12@12½ dis 10
Red ..... dis 70
Blue ..... dis 65

Chucks.

Cushman's 4 Jaw Independent ..... dis 45
" Combination ..... dis 40
" Geared Scroll ..... dis 30
" 2 Jaw Brass Workers ..... dis 30
" Drill ..... dis 35
Wescott's Scroll Combination ..... dis 33⅓
" Independent ..... dis 40
" Little Giant Drill ..... dis 30
Horton's Universal ..... dis 40
" Independent ..... dis 45
Whiton's Independent ..... dis 45
National Combination ..... dis 40
Sweetland " ..... dis 40
Almond Drill ..... dis 20
Morse " ..... dis 15
Skinner's Combination Lathe ..... dis 33⅓
" Independent Lathe ..... dis 40
" Universal Lathe ..... dis 40
" Drill ..... dis 15

Cutters and Reamers.

Cleveland ..... dis 10@15
Pratt & Whitney ..... dis 10@15
Standard ..... dis 10@15
Brown & Sharpe, Milling Cutters ..... dis 15
" Gear Cutters ..... dis 15

Crowbars.

Cast Steel ..... ₩ lb 4
Iron, steel points ..... ₩ lb 3½

Drill and Drill Sockets.

Twist drills ..... dis 50&10
Morse Taper and Straight shank to 1⅛" ..... dis 50&10
Morse Taper and Straight shank Larger than 1⅛" ..... dis 25
Drill Sockets ..... dis 25
Standard Twist Drills ..... dis 55@55&5
Cleveland " " ..... dis 55@55&5

Emery.

	No. 4 to No. 54 46 gr.	Flour, G. F. 150. gr.	F. FF.
Kegs, ₩ lb	4 c	5 c	2½c
½ kegs ₩ lb	4½c	5½c	2¾c
¼ kegs ₩ lb	4¾c	5¾c	3 c
10 lb cans, 10 in case	6 c	6¾c	5 c
0 lb cans, less than (	10 c	10 c	7½c

Emery Cloth and Paper.

Barder, Adamson & Co. ..... dis 45@50
H. H. Barton ..... dis 50@50&10

Emery Wheels.

Detroit ..... dis 55@60
Norton's ..... dis 55@60
Grant ..... dis 55@60
Sterling ..... dis 60
Celluloid ..... dis 10&33⅓
Northampton ..... dis 55
Crystal ..... dis 65@70
Vitrified ..... dis 60
Vulcanite ..... dis 10&10

Files.

Nicholson ..... dis 60&10@60&10&10
" X. F. ..... dis 25
Kearney & Foot ..... dis 60&10@60&10&10
Black Diamond ..... dis 60&10@60&10&10
Arcade ..... dis 60&10@60&10&10
Disston's ..... dis 65@70
Western ..... dis 70
Stub's ..... dis 25
Grobet's ..... dis 30
Reynolds Bros.' Hand Cut ..... dis 50
Industry File Works, hand cut ..... dis 50

Hammers.

P. S. W. ..... dis 40
Atha new list, Jan. 15, 1887 ..... dis 50
Heavy hammers and sledges under 5 lbs. 18c over 5 lbs 14c, new list.

Jack Screws.

Illinois Bolt Co. list ..... dis 70

Nuts and Washers.

Size of bolt inches	⅜	5-16	½	⅝	¾	⅞	1
Square	8	7	5½	4½	4	3½	3⅛
Hexagon	15⅝	11⅝	8⅝	6	5⅛	5⅛	5
Washers	9	8	7	5	4⅛	4⅛	4⅛

In lots less than 100 lbs, ⅜ lb add ¼c., lb boxes add 10 c to list.

Nails (wire.

List July 14, 1887 ..... dis 70 &10
Standard Penny Nails, ₩ keg card rate
{ Car lots $2.30
{ Less than car lots $2.40

Oilers.

Zinc and Tin ..... dis 60
Brass and Copper ..... dis 50
Malleable (Hammer's), No. 1, $3.60; No. 2, $4.00; No. 3, $4.40 ₩ doz ..... dis 10@10&10

Packing, Steam.

Boston Belting Co. ..... dis 60
American Packing Hemp ..... ₩ lb 10@11
Russia Packing " " ..... ₩ lb 14
Italian Packing " ..... ₩ lb 13@14
Plumbago Piston ..... ₩ lb 40
Morrison's " ..... ₩ lb 50
Square Flax " ..... ₩ lb 50
Sheet Rubber ..... ₩ lb 12&24
Excelsior Rubber ..... ₩ lb 40

Picks.

Railroads, 5 to 6 lbs ..... $12 dis 20
" 6 to 7 lbs ..... $13 dis 60

Pulleys.

Iron Pulleys, Walker List ..... dis 45
Medart Pulleys ..... dis 55
Split Wood Pulleys ..... dis 50@55

Rivets.

Iron, Thousand, list November 17, ... dis 50
Iron, Ordinary, Cooper's Block and Carriage list November 17 ..... dis 50
Copper ..... dis 50@50&10

Rope.

Manilla, ½ inch and over ..... ₩ lb 13½
Sisal, ½ inch and over ..... ₩ lb 12½

Sand Paper.

B. A. & Co ..... dis 45@50
H. H. Barton's ..... dis 40@45
New England Flint ..... dis 40@50
Barton's Garnet ..... dis 20

Saws.

Disston's Circular ..... dis 40@10
" Band ..... dis 20
" Scroll ..... Net
Hack Saw Stubs ..... dis 20
" " Eureka ..... dis 20
" " Star ..... dis 20
Saw Swages Disston's ..... dis 30
Atkins' Circular Saws ..... dis 40&45
" Mill, Mulay and Drag Saws .. dis 40&10
" Wood Saws ..... dis 40&10
" Silver Steel Diamond Cross-cut Saws ..... dis 70c per ft
" Dexter Cross-cuts ..... dis 50c "
" Diamond " ..... dis 30c "
" Tuttle Tooth Cross-cuts .. dis 25c "
" One-man Cross-cuts ..... dis 33c "
No. 1 Handles ..... dis 25c per pair
No. 6 " ..... dis 16c "
Excelsior Saw Tools ..... $6 per doz
Perfection " ..... $15 "
Detroit Saw Works, Circular ..... dis 50
" " " Band ..... dis 25
" " " Mulay ..... dis 45

Screws.

Wood Screws—New List 1890.

Flat head iron ..... dis 72½
Round head iron ..... dis 67½
Flat head brass ..... dis 72½
Round head brass ..... dis 65
Square Cap ..... dis 65
Hexagon Cap ..... dis 60
Set C. H. C. P. ..... dis 70
Machine, flat head, iron ..... dis 65
Machine, round head, iron ..... dis 60
Bench and hand— ..... dis 75@75&10
Lag or coach ..... dis 75@75&10
Coach patent gimlet point ..... dis 75

Shovels and Spades.

Ames' list November 1, 1885 ..... dis 20
Dennis ..... dis 5.25
Hussey & Binns railroad ..... dis 8.00

Taps.

Cards,	Hand and Nut to 2 in		dis 50
Carpenters'	" "	"	dis 50
Morse	" "	"	dis 50
Pratt & Whitney	"	new list	dis 10
Machine Screw Taps			dis 55
Pipe Taps to 2½ in			dis 70
Stay Bolt Taps			dis 25
Stove Bolt Taps			dis 50
Pulley Taps			dis 40

Twine.

	BC.	B.
No. 12, Flax Twine, ¼ and ⅛ lb Balls	21c@29c	
No. 18 " " ¼ and ⅛ "	18c@28c	
No. 36 " " ¼ and ⅛ "	16c@27c	
2-Ply Hemp, ¼ & ⅛ lb Balls (Spring Twine 1	¼c	
3-Ply " 1 lb Balls	12@12½c	
3-Ply " 1½ lb Balls	11@11¾c	
Cotton Wrapping, 5 Balls to lb	15@16c	

Vises.

Solid Box ..... dis 60
Parker's ..... dis 20@25
Prentiss ..... dis 20
Stephen's ..... dis 25@30
Barrett's ..... dis 30
Miller's Falls ..... dis 40
Merrill's ..... dis 15@20
Howard ..... dis 25

Wire.

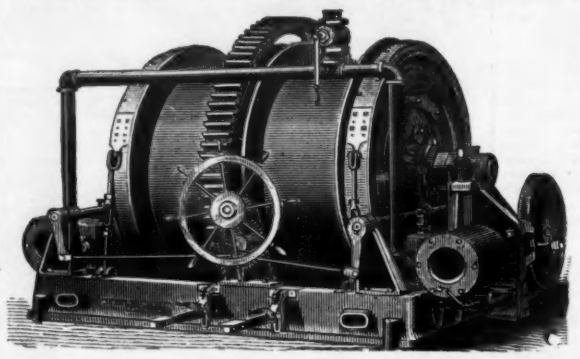
New List, Jan. 18, 1884

Brass and copper ..... dis 20@25
Bright and annealed, Nos. 0@18 ... dis 70&10@75
" " Nos. 19@26 .. dis 75@75& 5
" " Nos. 27@36 .. dis 75&10& 5
Coppered Nos. 0 to 18, market list .. dis 70@70& 5
Galvanized Nos. 0 to 18 " " ..... dis 65&5
Tinned market Nos. 0 to 18 ..... dis 67½
Cast steel ..... dis 50
Tinned Broom Wire ..... dis 70&5@70&10
Annealed Fence, Nos. 8 and 9 ..... dis 70
Annealed Grape, Nos. 10 to 14 ..... dis 70
Stub's Steel Wire, regular ..... $5.00 ₩ lb dis 5

Wrenches.

Coe's genuine, ... dis 50
Girard Standard ..... dis 70&10
Agricultural ..... dis 75&10
Mechanics' ..... dis 55&10,& 5
Bemis & Call's Combination ..... dis 35
Donohue's Engineers ..... dis 20&10
Lamson & Sessions Engineers ..... dis 60
Billings & Spencer's Drop Forged ..... dis 25
William's " " ..... dis 25
Alligator " " ..... dis 50

Webster, Camp & Lane Machine Co.



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Improved Band Friction Hoisting Machinery, Geared or Direct Acting, for round or flat rope.

Wire Rope Haulage Machinery,

Endless or Tail Rope Systems.)

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Automatic or Slide Valve Steam Engines, Sheaves. Cages, Buckets, Etc.

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IRON CASTINGS.

DAILY MELTING CAPACITY 75 TONS-SPECIAL FACILITIES FOR ECONOMICALY TURNING OUT SMOOTH CLEAN CASTINGS.

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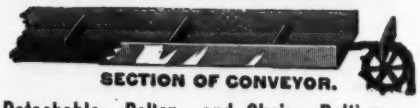

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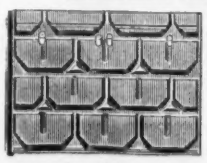

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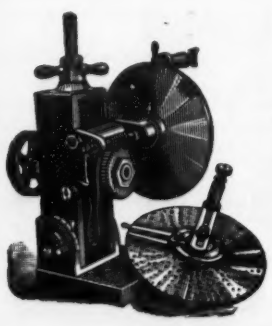

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Russell Jennings' augers and bits.....dis 25
Expansive Bits, Clark's small, $18; large, $26.....dis 35@35&5
Hollow Augers, Ives'.....dis 25&10
Hollow Augers, Bonney's Adjust. ₩ doz., $48.....dis 40&10
Hollow Augers, Stearns' Adjust. ₩ doz., $48.....dis 20&10
Gimlet bits, common.....per gross $3 25@4 00
Standard Bit Stock Drills.....dis 50&10&5
Ship Augers.....dis 15&10@15&10&5

Axes.

Makers' and Special Brands—
First quality.....₩ doz $7 00
Others.....₩ doz $6 00
Full polished.....₩ doz $8 00

Bolts.

Cast iron barrel bolts.....dis 70
Cast iron shutter bolts, etc.....dis 70
Cast iron chain bolts.....dis 65&10
Ives' patent door bolt.....dis 60
Wrought iron barrel bolts.....dis 70
Wrought iron square bolts.....dis 70
Wrought shutter bolts.....dis 60&10
Sargent's list
Carriage, common, new list.....dis 75&10
Tire, common, new list.....dis 65
Carriage and tire, Philadelphia pattern.....dis 75&10
Stove bolts.....dis 60
Plow bolts.....dis 60&5
Machine.....dis 75&10@80
Ends.....dis 75&10&80

Buckets, Elevator.

.....dis 50&10

Butts.

Wrought brass.....dis 75&10
Cast brass, loose joint.....dis 33⅓
Cast Iron—
Fast joint, narrow.....dis 50&10&5@60
Fast joint, broad.....dis 50&10@60
Loose joint.....dis 70&10
Loose joint, jap.....dis 70&10
Loose joint, jap. with acorns.....dis 70&10
Loose pin, acorns.....dis 70&10
Loose pin, japanned acorns.....dis 70&10
Loose pin, acorns, jap. plated tips.....dis 70&10
Wrought steel—
Wrought, fast joint, narrow.....dis 70&10
Wrought, fast joint, broad.....dis 70&10
Wrought, loose joint, broad.....dis 70&10
Table Butts, back flaps, etc.....dis 70&10
Regular inside blind.....dis 70&10
Light inside blind.....dis 70&10
Loose pin.....dis 70&10
Light loose pin.....dis 70&10

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Asphaltum, Fine Grade, ₩ lb.....08
Coal Tar Felt, 1 Ply, ₩ lb.....02
Coal Tar Felt, 2 Ply, ₩ roll 108 sq ft.....1.42½
Coal Tar Felt, 3 Ply, ₩ roll 108 sq ft.....1.85
Roofing Pitch, ₩ gal.....09

Chains.

Revised List.

Trace, 6½-10-2.....₩ pair 1.03
Trace, 6½-10-3.....₩ pair .92 } .....50&10
Trace, 7-10-2.....₩ pair 1.11
German Halter Chain, list June, 1887...dis 50&10
German Coil, list of June, 1887.....dis 50&10@60
Galvanized Pump Chain.....₩ lb 5½@6
Jack Chain, Iron.....dis 75&10
Jack Chain, Brass.....dis 75

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Socket Framing and Firmer.....dis 75
Socket Framing and Firmer, Buck Bros..dis 30
Socket Firmer and Framing, L. & I. J. White.....dis 30@30&5
Tanged Firmers.....dis 40&10

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Table.....net
Excelsior Pocket.....net

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	Nos. 1	5.	5X.
Pails, water, 12 qt	$4 00	$4 50	$.....
Dairy, 14 qt	4 50	5 00	.....
Fire 12 qt	5 00	....	.....
Sugar	6 00	6 50	.....
Horse	.....	5 00	.....
Buggy	4 00	.....	.....
Chamber, Slop, Commode } 5 and 5X 14 qt.	6 50	7 50	8 50
Wash. slop, 5 and 5X 14 qt	8 00	9 00	10 00
Basins, wash—			
10½ inch	2 00	2 25	.....
12 inch	2 25	2 75	3 25
13½ inch	2 75	3 25	3 75
15 inch	3 25	3 75	4 25
Bowls, fruit	.....	2 50	.....
Servers, 12 in	.....	2 25	.....
Baskets, waste paper, 13 in	.....	6 00	.....
Spittons, "Daisy," pressed 8 inch	4 00	4 50	5 00
10 and 11¼ inch	6 00	6 50	7 50

No. 1 plain; No. 5 decorated; No. 5X White decorated.

Gimlets.

Nail and Spike.....dis 50&10&5
Double cut, low list.....dis 25
"Bee".....₩ gross $12, dis 25@25&5

Hanger

Barn door, old patterns.....dis 60&10&10@70
Climax, (Anti-Friction).....dis 55
Scranton.....dis 33—
Kidder's.....dis 50&10@60
Terry's Patent.....5 in., $12; 4 in., $10, dis 50&5
Paragon.....dis 40&10
Richard's.....dis 30@30&10

Horse Nails.

	No. 10	9	8	7	6	
Ausable, ₩ lb.	23	24	25	26	28	dis 40
Putnam, ₩ lb.	18	19	20	21	23	dis 15
Essex						dis 25&10

Horse Shoes.

Burden, at factory.....₩ keg $4 00
R. I. Horshoe Co., Perkins' Imp. at factory.....₩ keg $4 00
Mule Shoes, at factory.....₩ keg $5 00

Knobs.

Carriage, japanned.....₩ gross 80c dis 60&10
Base, rubber tip.....dis 70&10&5
Hemacite door knobs, new list.....dis 40&10@50
Door mineral.....dis 65c@68c
Door Por. japanned.....dis 75c@78c
Door Por. nickle.....$2 00@2 25
Door Por. plated.....$3 00@3 [illegible]

Locks, Bolts, Etc.

P. & F. Corbin, Locks and Bronze Goods.
Door locks, knobs and latches.....dis 60&10
Escutcheons and keys.....dis 60&10
Padlocks and padlock keys.....dis 75
Bell pulls, mineral, porcelain and jet dis 60&10
Bell pulls, genuine bronze.....dis 60&10
Lever bell pulls, genuine bronze.....dis 60&10
Butts', genuine bronze.....dis 60&10
Butts' bronze plated.....dis 60&10
Store door locks and latches.....dis 60&10
Store door handles.....dis 60&10
Shutter hinges&flaps, genuine bronze.dis 60&10
Shutter hinges, bronze plated.....dis 70
Flush bolts, genuine bronze.....dis 70
Shutter knobs, genuine bronze.....dis 50
Shutter bars, genuine bronze.....dis 60
Sash lifts, genuine bronze.....dis 60
Sash pulls and plates, genuine bronze.....dis 60
Push plates, genuine bronze.....dis 60
Drawer pull, genuine bronze.....dis 70
Letter box plates, genuine bronze...dis 60&10
Barn door locks.....dis 33⅓
Bishop's Buckeye Sash Locks.....₩ gross $4.[illegible]

Plumbs and Levels.

Standard list.....dis 70&10
Pocket levels.....dis 70&10
Davis' inclinometers.....dis 10[illegible]

Pumps.

Cistern, best makers.....dis 50&10@60
Pitcher spout, best makers dis 60&10@60&[illegible]10
Pitcher spout, cheaper goods.....dis 70@[illegible]

Pokes, Animal.

Bishop's I. X. L.....₩ doz $[illegible]
Bishop's O K.....₩ doz $[illegible]
Bishop's Pioneer.....₩ doz $[illegible]
Bishop's American.....₩ doz $[illegible]

Rakes.

Cast steel.....dis 70
Malleable.....dis 70&10&5

Razors.

J. R. Torrey Razor Co.....dis 20
Wostenholme & Butcher.....$10@$[illegible]...dis 10
Rifle razor.....dis $9 50 net

Rat Killers.

Schuyler's.....₩ gross $15 00

Scales.

Hatch, Counter, No. 171.....₩ doz $21 00
Hatch, Tea, No. 161.....₩ doz $6 75@7 00
Chatillon's Grocers.....dis 50
Family Turnbulls.....dis 30@10&10
Scale Beams, List of January 12, 1882.....dis 50&10@50&10&4

Screw Drivers.

Stanley R. & L. Co.'s Varnished Handles.....dis 05&1[illegible]
Stanley R. & L. Co.'s Black Handles..dis 60&10
Sets interchangeables.....₩ doz $18 dis 25

Squares.

Steel and iron.....
Nickel plated..... } dis 75&10@80
Disston's try square and T bevels....dis 45&10
Winterbottom's try and miter.....dis [illegible]

Tacks, Brads, Etc.

New List, Oct. 19, 1800.

American iron carpet tacks all kinds.....dis 77½&10
Steel carpet tacks all kinds.....dis 75&10
Swedes iron carpet tacks, all kinds.....dis 75&10
Swedes iron tacks.....dis 75&10
Swedes iron Upholsterers' tacks.....dis 75&10
Tinned Swedes iron tacks.....dis 77½&10
Tinned Swedes iron Upholsterers' tacks.....dis 77½&10
American iron cut tacks.....dis 77½&10
Copper tacks.....dis 40&10
Copper finishing and trunk nails.....dis 50&10
Cigar box nails.....dis 50&10
Finishing nails.....dis 60&10
Hungarian nails and miners' tacks...dis 60&10
Gimp and lace tacks.....dis 77½&10
" " " tinned.....dis 60&10
Trunk and clout nails.....dis 72½&10
Tinned trunk&clout nails.....dis 66&10
Basket nails.....dis 66&10
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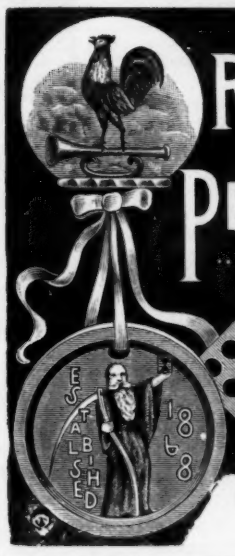

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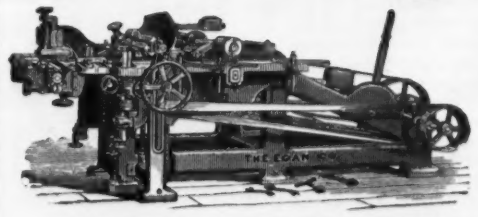

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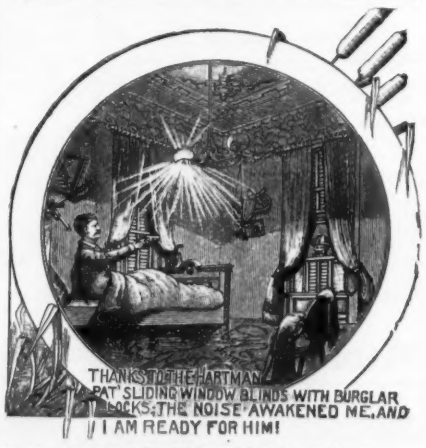

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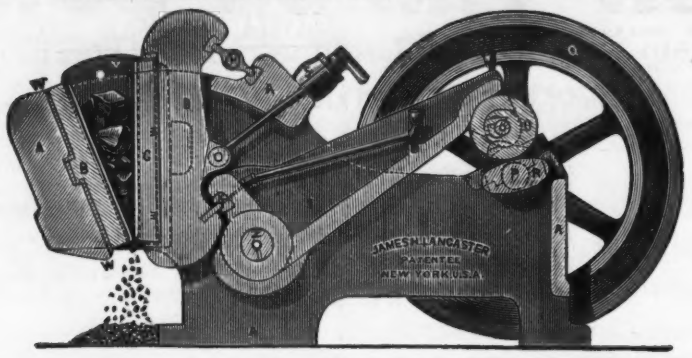

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Will automatically dig, raise and discharge mud, clay, gravel, sand, hard pan ores, rock phosphates and fire-clay from their beds and banks, and also load and unload vessels or barges with sand, coal, ores, grain and other materials. These Grapples are made of best forged steel, with four penetrating scoops, operated solely by compound leverage, thus dispensing with the inside sheaves, drums, catches, gears, chains and friction, found in all rival buckets. They may be worked by the "Lancaster" hand or horse-power, hoisters, or by any maker's double drum hoisting engines.

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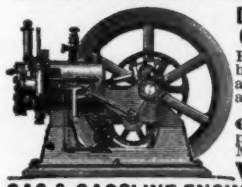

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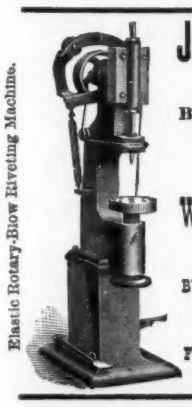

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Mahoning Accommo.....		†6 40 a m
Pittsburgh Express.....	†6 25 p m	
Youngstown Local.....	†8 05 a m	
Mahon'g div. & Pitts Local		*11 40 a m
Mahoning Val. Accom.....		†4 30 p m
Pittsburgh Express.....	‡1 20 p m	11 10 p m
New York Express.....	*8 00 p m	.....

*Daily. †Daily, except Sunday. ‡Daily except Monday.

Cleveland & Canton Railroad.

(Standard Gauge.)

Depart for—

Zanesville and Coshocton—6:50 a. m., 3:00 p. m.
Canton—6:50 a. m., 3:00 p. m., 6:20 p. m.
Kent—6:50 a. m., 3:00 p. m., *5:45 p. m. 6:20 p. m.
Bedford—6:50 a. m., 11:10 a. m., 1:30 p. m., 3:00 p. m., 4:40 p. m., *5:45 p. m., 6:20 p. m. 10:35 p. m.
Newburgh—6:15 a. m., 6:50 a. m., 11:10 a. m., 1.30 p. m., 3:00 p. m., 4:40 p. m., *5:45 p. m., 6:20 p. m., 10:35 p. m.

Arrive from—

Zanesville and Coshocton—10:30 a. m., 6:30 p. m.
Canton, 10:30 a. m., 2:35 p. m., 6:30 p. m.
Kent—*8:10 a. m., 10:30 a. m., 2:35 p. m., 6:30 p.m.
Bedford—6:00 a. m., *8:10 a.m., 10:30 a.m., 1:05 p. m., 2:35 p. m., 4:15 p. m., 6:30 p.m., 7:10 p.m.
Newburgh—6:00 a. m., 7:15 a. m., *8:10 a. m., 10:30 a. m., 1.05 p. m., 2:35 p. m., 4:15 p. m., 6:30 p. m., 7:10 p. m.

Trains marked * run daily.

Valley Railway.

FOR AKRON, CANTON AND MARIETTA.

Depot oot South Water Street.

	Depart.	Arrive.
Valley Junction Mail.....	*7 25 a m	*6 40 p m
Chicago Express	*8 35 a m	* 0 00 p m
Marietta Express.....	†11 15 a m	†2 35 p m
Balto. & Wash. Express....	*4 00 p m	*10 25 a m
Cleve. and Canton Express	†6 30 p m	†8 20 a m

*Daily. †Daily, except Sunday.

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From Cleveland Union Station.

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	Arrive.	Depart.
For Pittsburgh, Baltimore, Washington, Philadelphia and New York.	d5 25 a m	7 45 a m
	d11 40 a m	d1 40 p m
	6 35 p m	d11 10 p m
Wellsville, Wheeling and Bellaire.	12 30 p m	7 45 a m
	6 35 p m	1 05 p m
	.....	*11 10 p m
Alliance Accom.	10 10 a m	3 25 p m
Ravenna Accom.....	8 25 a m	5 00 p m

d Daily. * Excent Saturday. Other trains except Sunday. Through Pullman Sleepers to New York on 1:40 p. m. train daily.

From Cleveland Union Station.

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Cleveland & Pittsburgh R. R.

	Arrive.	Depart.
For Cuyahoga Falls, Akron, Orrville, Millersburg, Gambier, Mt. Vernon, Columbus, Xenia, Dayton, Cincinnati, Louisville, Indianapolis, St. Louis, and all points in the South and Southwest	d 7 00 a m	8 00 a m
	5 40 p m	d 8 00 p m
For Cuyahoga Falls, Akron, Orrville, Millersburg, Gambier, Mt. Vernon and Columbus.	12 30 p m	1 05 p m
For Cuyahoga Falls, Akron, Orrville, Chicago, and all points in the West and Northwest.	5 40 p m	8 00 a m
	10 10 a m	3 25 p m

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No. 66, Mantua Accommo.....	* 4 20 p m
No. 74, Youngst'n Ex.....	† 6 00 p m
No. 68, New York & Pitts. Ex.....	*11 00 p m
	Arrive.
No. 61, N. Y. & Pittsburgh Express...	† 5 15 a m
No. 71, Youngstown Accom.....	* 7 15 a m
No. 65, New York & Pitts. Lim.....	* 9 55 a m
No. 67, Pittsburgh Accom.....	*12 30 p m
No. 73, Leavittsburgh Local.....	* 2 10 p m
No. 63, New York & Pitts. Ex.....	* 6 50 p m
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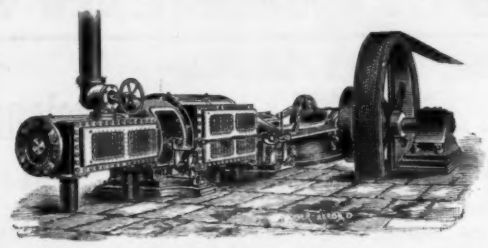

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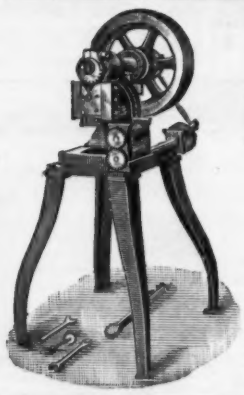

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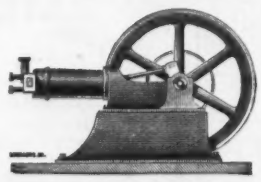

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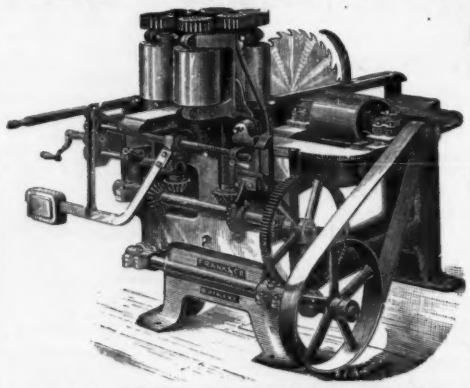

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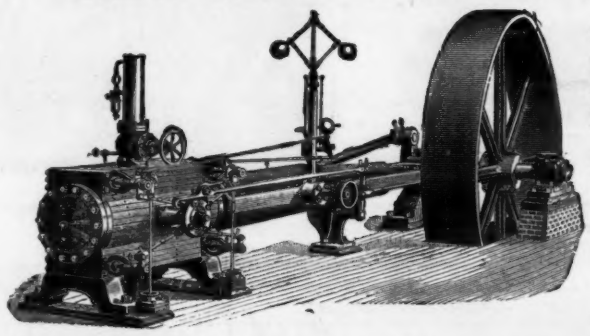

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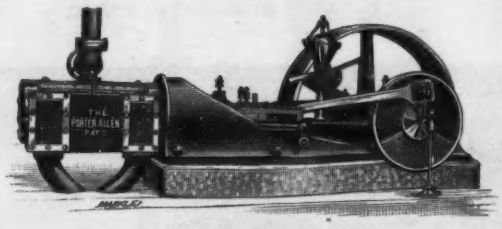

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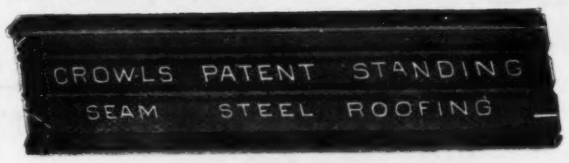

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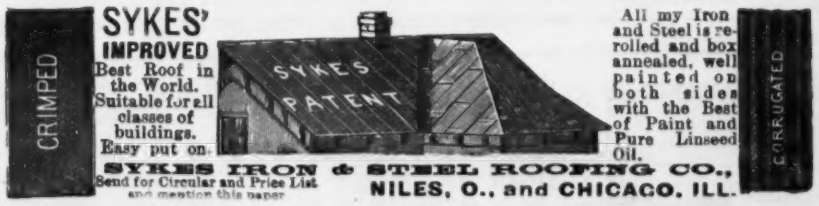
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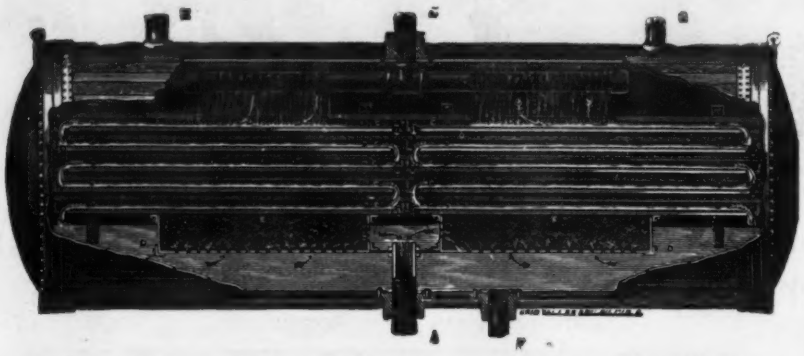

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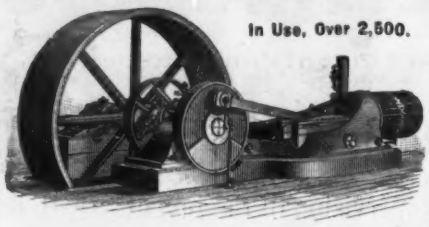

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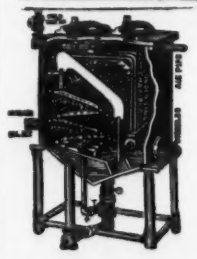

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